THEATRE CATALOG

1947-48

SIXTH ANNUAL EDITION

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EDITORIAL FOREWORD

An already great, and internationally accepted, annual periodical herewith adds another edition to its impressive set of reference text books relating to the design, construction, maintenance, management, and special equipment of the physical theatre.

Slightly more international in its editorial coverage, a busy staff has labored constantly for still another year in order to find and inspect the new construction and major remodeling that took place since the last form closing date. Every specializing theatre supply dealer, not only in the U. S. A. and Canada but to the farthest corners of the known world, was contacted for his views on the merit of the construction work done in his particular area; thereby forming what is probably the largest board of editorial consultants ever assembled in the theatre industry. Photographers, artists, engravers, printers, and binders added their respected skills to portray and visualize to the best advantage the basic factors that would prove most interesting. All of this in order to fulfill the first of the two basic principles upon which THEATRE CATALOG was founded with the 1940 Edition: *To record the new construction and design trends of all types and sizes of theatres in each given year.*

Skilled experts and technical authorities—students all—then combed the voluminous minutes and highly specialized papers of engineering and science societies in fields which are far removed from the theatre, in order to learn, and reduce to understandable terms, the new ideas, theories, and practices now aborning that stand a reasonable chance to one day add to the functionalism, perfection, economy, or showmanship of our master and servant—the physical theatre. Manufacturers, importers, service companies, and vendors in many fields were carefully probed for their design and method changes, their recommended practices, and their maintenance helps. Fabric weavers, artists, plastic molders, and iron smiths, added to their share. And all of this was done in order to fulfill the second basic principle upon which THEATRE CATALOG was founded: *To forecast the future developments that through the years are making of the physical theatre the most modern of all buildings.*

The success of these two basic principles is best indicated by the numerous new theatres pictured in this 1947-48 Edition that were originally presented in the blueprint stage in the 1945 Edition; and by the many successful common uses of pre-fabricated arch construction, electrostatic air cleaning, black light decorating, correct floor slopes, parking lot requirements, confection vending, germicidal lamps, and so forth shown in this 1947-48 Edition but originally introduced by THEATRE CATALOG in some cases as long ago as the 1941 Edition.

These are the objectives and these are the accomplishments that have made a series of consecutive editions of THEATRE CATALOG, the most prized and most useful reference source at all times of building remodeling and purchasing.

The two basic principles upon which THEATRE CATALOG was founded, have proved their worth internationally; and will continue to be elaborated on with each succeeding annual volume.

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NEW DESIGN

1947-48

Design Ideas for America's Playhouses

The Scenic Designer Looks at the Theatre From Standpoint of Present, Future Needs

Jo Mielziner
Scenic and Stage Lighting Designer

FOREWORD

The problems of theatres as physical properties vary according to the purposes for which the house was built, and a legitimate theatre has requirements little considered by the cinema. Yet out of the study of the problems of both and an analysis of the solutions achieved, a mutually beneficial interchange of knowledge may be accomplished.

Some of the problems — and their solution — of the legitimate theatre are presented in this article, an amalgamation of three pieces — "Scenery in This Play?" "So Little Time," and "Note to Architects" — which originally appeared in Sunday editions of the New York Times under the present byline. Permission to reprint this material was granted by Daniel Schwarz, of the Times Sunday Department.

NOTE TO ARCHITECTS

The air is astir with plans for new theatres. The pent-up demand for them is at last convincing the property owners that the building of legitimate theatres is a fertile field for investment. Although there have been no new theatres, attempts have been made to transform some of the old ones into something more closely approaching the ideal. The pleasantly renovated Coronet is an example of a step taken in the right direction.

So far, so good — but this is only scratching the surface. The extent to which old theatres can be modernized is strictly limited. What is needed is a fresh and foresighted point of view. Joseph Urban's Ziegfeld Theatre, now more than 20 years old, incredibly enough, is the last word on the subject. Since then the number of theatres has been approximately halved, diverted one by one to continuous movies or to broadcasting studios, or torn down to make way for other buildings. The past season indicated the abysmal degree to which the fierce jockeying for playing time in the existing houses could strangle the incoming drama.

An intelligently designed theatre building and its operation can pay off handsomely, foot for foot, as any other form of real estate. Since the owners will be calling in the architects, I hope there is still time for a designer behind the footlights to make some recommendations.

The Pool of Knowledge

The dirth of theatre-building has discouraged, until now, the pooling of the combined requirements and knowledge of the audience, producer, actor, designer, and related theatre technicians.

I would urge first that all experts in all branches get together with the architects and discuss their technical functions and needs. Let them point out the less obvious short-comings of the present theatre buildings, so that past mistakes can be avoided.

The rich reservoir of allied theatre craftsmen should be drafted to insure that the theatres now aborning will be serviceable far into the future.

The blueprints for existing theatre buildings took into consideration, apparently, only one group: the theatre owners.

Maximum seating capacity to the cubic foot seemed to be the guiding principle. Short-sighted failure to provide additional necessary space and equipment have limited the uses to which these theatre buildings can be put, the number of hours a week during which they can be used, and cut off their sources of increased revenue.

The uneconomic allocations of theatre space also boosts the cost of back-stage operations to ruinously high figures, a fact which becomes notable when you consider the man-hours needed to set up and dismantle scenery units which could otherwise be kept in "live storage."

The Playgoer's Approach

Let the architect for the new theatre start with considerations of the playgoer's approach to the playhouse: a lobby wide enough to accomodate lines at a hit show without packing them into subway formation; two box-office windows, placed on opposite sides of the lobby, one for advance reservations and one for the current performance.

While on the subject of box offices, I would like to see abolished the whole set-up of cages that suggest a speakeasy atmosphere and surreptitious manipulations within. Substitute for it, the arrangements of a modern bank, with its open and above-board desks. The open window arrangement would take little more space than the old-fashioned cage and would break down a pernicious psychological barrier.

Intermission Relaxation

Make ample provision for the audience's relaxation during intermissions. The old theatres almost never recognized the difference between a lobby and a lounge. The lounge should be in another part of the house, and I believe that the space devoted to it could more than earn its keep in a variety of ways. Not only income from dignified displays of refreshments, books, and theatre periodicals, but there could be sizeable revenue from advertising displays of luxury merchandise. Jewelry and perfume manufacturers, for instance, who are now confined to advertising in The Playbill, would pay a good revenue for the opportunity to set handsomely designed display cases in the lounges of leading theatres.

Tomorrow's theatre architect must naturally reconsider all the obvious audience discomforts which have driven scores of legitimate theatre patrons to the movies and who would return in droves with an adequate assurance that they could at least hear what was going on. The technical means are known; they have only to be properly used.

Backstage

As for the "back of the house," or everything behind the footlights, the most important caution, I believe, is for the architect of the new theatre to recognize the trend of producing. The appetite for repertory is growing. The niggardly space in present theatres assigned for storage and movement of scenery is often inadequate even for a simple two-set play. Ample "hanging space"—space in which to "fly" and stack scenery—is the greatest single need backstage. Installation of equipment to move scenery —such as revolving stages, moving platforms, elevators—will repay the additional investment by the increase in the number of kinds of attractions that can play at one theatre.

It is ridiculous that the theatre building, as it is operated now, yields a revenue for only 24 hours a week. This is simply the unintelligent result of a backstage shortage of space so acute that only one production at a time, and that one with difficulty, can be adequately stored.

Increase this space to functional requirements—and you have not only a theatre which can house repertory, but one which can enormously increase its revenue through simultaneous rentals to different tenants at different times of the day.

With ample storage space for various productions, there could be morning matinees for children; afternoon performances of experimental productions or revivals; concerts, meetings, lectures.

The colossal amount of dead, unproductive time is due largely to a lack of live storage space backstage. A "commercial" hit show going on every night could make possible a variety of other "sustaining programs" — similar to the system in radio — at other times of the day.

Another great backstage need is standardization of dimensions and equipment. The choice of the home for "Dream Girl" was narrowed down to the Coronet simply because it was the one house available that had sufficient wing space on each side of the stage to accommodate the shuttling platforms. If this comedy hit should ever have to move to another Broadway house, it would have to have much of its scenery redesigned and rebuilt!

SO LITTLE TIME

It would be possible to continue, and make a dozen more suggestions, but no more apparent would be the main point: There is no reason for the dream theatre to remain a dream. After all, the requirements are known, and we have the skilled technicians to call on for guidance in fulfilling them. All that is needed now to make the dream real is enough economic insight on the part of our builders to realize that informed theatre planning means not only good art but good business.

However, when this dream theatre comes into being, provision should be written into the whole scheme of things to eliminate a complaint which has beset all creative director-designer teams for years and which has grown progressively worse during the past quarter of a century.

Like all healthy complaints, it is aimed as much at myself as it is against what we call "Conditions in the Theatre." Briefly my complaint is this: Insufficient time generally is allowed for the pre-rehearsal creative planning in the theatre.

Although unavoidable war conditions intensified the mad tempo of production planning, this frantic speed-up has been a growing habit in the theatre since I first became a Broadway designer in 1923. When I say creative planning, I refer to all the really formulative thinking and planning contributed by the author, the director, and the designer prior to the actual rehearsals. I firmly believe that there is no clear line of demarcation between the planning phase of the director's work and the creative plan of a good designer's job. Good designing is essentially clear, concise, directorial choreography. The ideal would be a director with the facilities to do his own designing—and enough time.

A Typical Schedule

It is no great exaggeration to say that the following episode, though brief, is fairly typical of what actually goes on in the theatre today. Producer X, after months of work, decides that manuscript 711 is to be produced. After winning the uphill battle of casting and financing, the day has come. A calendar in front of him, the harassed producer is at his desk, surrounded by business manager, booking negotiators, yes-men, and no-men. In his right hand he grasps a telephone. The great moment is at hand. Thirty-six days, four hours, and twenty minutes from this second, a theatre will be available. The money is in the bag—under the producer's feet. The agents have assured him of the star's availability. Producer X lifts up the receiver, dials the number of one of his creative team; it might be the director, it might even be me. As the connection is made, he screams, "We open five weeks from tonight at 8:40."

There are only seven days on the artist's schedule before building contractors, scenic studios, and electrical contractors must be called in to bid on Mr. X's production. If the designer is strong and healthy, he does not have to sleep or eat that first 24 hours, particularly if his family loves the theatre, too, and is willing to give him up altogether. So he reads the manuscript. Sometimes, under extraordinary conditions, he will have enough time to glance at the play a second time.

In the following six days, all the designer has to do is to get his ideas and

IMPLIED SCENERY is further emphasized in Scene 10 of Robert E. Sherwood's "Abe Lincoln in Illinois," shown here with Raymond Massey in the title role. Left out of the original design here, too, were the doors and windows, and the unneeded pictures, furniture, and trimmings. Although the amount of detail was greatly reduced, what is left is still realistic, and still in period. Such Mielziner-designed scenes as these can aid the theatre to regain lost patronage through a more economical staging of more, better productions. (Photograph courtesy of Playwrights' Company.)



do a little hasty research. There is no time to go to the library, but there is always a New York telephone directory or an illustrated dictionary handy for ready reference. If he is lucky and a good shop is in the neighborhood, he can look at fabric while eating a sandwich lunch. Under no circumstances, however, is the designer permitted the luxury of a second thought! The first design idea that strikes him is the design, good, bad, or indifferent. Sometimes the designer and the director have as much as a good hour together to exchange ideas.

Second week: The director has approved sketches and plans on paper. By the end of the first week of rehearsal, problems have arisen in certain scenes when actually tried out and rehearsed which necessitate changes. This is normal and quite usual. While the actors break for the lunch hour, the director, balancing a bottle of milk on the telephone company's handy high shelf, holds a sandwich in the same hand that accommodates the earphone. At the other end of the line, the designer is in the builder's shop, just behind a buzz saw; the wind from the fan is blowing his blueprint, but he firmly stands on it with both feet and screams his end of the conference into the telephone. This type of conference is naturally a little hard on the digestive systems of both parties, but actually a lot harder on the quality of the final production on the stage.

Now comes either a tragedy or a comedy. Too often it is the former. The production is assembled in the theatre. Privately the designer's heart sinks. He sees too many bits and pieces assembled for the first time. Individually and in their respective shops of creation, they seemed right, but put together they fail to capture what was in his creative mind.

The director is even more sadly disillusioned. "I never imagined there was so little room in the second act!" During that first telephone conference he thought he had heard the designer say something different. The comedy, which is rare, very rare, is when the director walks into the theatre and says "How amazing! What a coincidence! That's exactly the quality I planned myself. It is astonishing how clairvoyant you are! We both had the same thought!"

What to Do?

This slightly exaggerated and brief outline is the story of top-notch directors and top-notch designers. They are men with every desire and ability to do the best work in the theatre. The reasons for this mad scramble are many. It is a vicious circle. Producer X will not fire the starting gun until he has secured a booking and a star or a cast, but he often fails to realize that the creative planning team should have plenty of time to mull over and create a master plan for the production. One of the great qualities of the European theatre has been the development of working teams headed by a creative director. It is true that our economic and labor conditions would make it impossible for a company to live together for weeks and months before final rehearsal. However, I do think that the economic investment on the part of the producer in giving his creative team a head start would pay dividends.

One of the hardest jobs of the director-designer combination is to achieve a boiled-down essence of what the play really needs in the way of production. I am speaking in terms not alone of scenery, but light, costumes, tempo, and sound. This boiled-down essence cannot be achieved in a hasty conference of a quickly digested first idea.

SCENERY IN THIS PLAY?

One of the worst influences Hollywood has had on American playwriting and production is an exaggerated instance on literal realism in the theatre. Too many good manuscripts are written in terms of "realism" as the camera's eye sees it. To me, the best realism in the theatre is selective realism. I do not mean necessarily impressionism, but translating an author's script in terms of a theatric reality is a hard job to do. The authors could and should employ it more in their writing. However, a creative director-designer team can achieve this if it is given time to do so.

Several years ago, when that brilliant production, "Our Town," was running on Broadway, there was much controversy regarding plays without settings. People were reported asking at the box office "Is there any scenery in this play?"

The real question, the question worth asking, is "Is there any theatre in the scenery?"

For there is no such thing as presenting a play without scenery. The moment a company starts speaking their lines, even on an empty stage under a work light, there is a setting, though perhaps not a very effective one. The stage platform elevating the players above the audience is theatric in itself. The concentrating work light also adds a focal and dramatic element to the scene.

There is nothing new in the attempt to simplify the setting for a play. It dates back to the first formal drama. But there is always something new in a fresh attack on an old problem. I believe that the designer in the modern theatre (and I go back to Adolphe Appia and Gordon Craig) has always been eager to attack his job in a fresher and more imaginative manner. And the audience, for its part, is quick to welcome an unconventional production, provided it is theatrically effective.

Implied Scenery

The reason such attempts are rare is due to the fear of playwrights and producer of offending the audience's sense of reality, and to their lack of faith in the appeal of imaginative and suggestive settings. Even in Hollywood, however, where belief in the literal-mindedness of the public is a practically unquestioned canon, the average cameraman and director knows and uses to advantage such simplifications as the close up, which eliminates all detail and focuses attention on the actors. If a lens is ever invented that will allow the entire contents of a room to be viewed under the comely chins of Charles Boyer and Irene Dunne, in a closeup, I am afraid there will be a rush to use it! There is always the old urge to overstate facts which are only important if they are implied once.

What I call Implied Scenery is, for me, the most effective. It is a rare and happy day when I have the chance to caress a good play with just that right touch, and I was, therefore, grateful to the courage and faith of the Playwrights' Company for the chance to try a scenic experiment with the new production of "Abe Lincoln in Illinois," which is now in its second year in New York.

In my original designs for the play, which was then at the Plymouth, I reduced the settings to a sort of concentrated realism with the purpose of accenting the most telling objects in each scene.

In moving the play to the larger Adelphia, the Playwrights presented me with this problem: To design a simple, fast-moving, easily-handled production of this 12-scene play, sacrificing nothing of its dramatic effectiveness, yet scaling the operating costs within the range of the wonderful ideal of a popular dollar-top theatre.

I began by listing the endless non-essentials (and it was an endless list) which had surrounded the actors in each of the twelve scenes originally, and then proceeded to pare down the list.

Take, for example, the scene in which young Lincoln visits his future bride, Mary Todd, in the formal parlor of the Ninian Edwards home. At first, the scene depicted a mid-Victorian home in all—or nearly all—its fussy elegance of drapes and doodads. When I finished my censorship of the list of items, there remained, as essentials: (a) beautiful character-revealing lighting; (b) the one period sofa and the two chairs actually for the actors to sit on; and (c) a story-telling mantel-shelf and iron stove, to communicate the mood and character of that particular family at the particular period.

Left out were the walls, the doors, the windows, the draperies, pictures, unneeded furniture, and extra trimmings. And when the scene came to be rehearsed at the Adelphi, it was found that the lack of a door not only did not prevent Mr. Gaines, as Lincoln, from making an effective entrance—its absence actually punctuated Sherwood's beautiful lines.

An emphasis of a different kind is provided in the second scene, when the pessimistic old veteran of the Revolution, Ben Mattling, is trying to dissuade young Abe Lincoln from going into politics. In its original setting, the walls of the Rutledge Tavern were decorated with engravings of former presidents of the United States, and in his diatribe against the degradation of the democratic dogma, old Ben would point to each in turn as he spoke the lines "Look at Washington. Look at Jefferson. And John Adams. Where are they today? Dead!" The line was always good for a laugh. But in the present production, the tavern has no walls; there are no pictures of the presidents. Old Ben speaks the lines without pointing. And yet the laugh on his final indignant "Dead!" is far louder than it used to be at the Plymouth. Why?

Because a non-essential has been removed. When Ben used to actually point to the portraits, there was a slight distraction. Instead of focusing entirely on the actor and his words, the audience used to follow his pointing cane. Perhaps some of them wondered if the pictures on the wall were really of Washington, Jefferson, and Adams. At any

rate, there used to be a certain division of interest, whereas today's audience reaction to the scene is far quicker and heartier as a result of eliminating a non-essential.

The final scene, in which Lincoln speaks his farewell to Illinois, has now been set with only one so-called "piece of scenery"—the rear platform of the train—and only a few feet of that.

Note that although the amount of detail has been very much reduced, what is left is still realistic, still in period. Had I designed a stylized or impressionistic train platform, it would not have been appropriate to Sherwood's script. In fact, it would have been an impertinent intrusion of a point of vire foreign to the play.

New Role for Light

With the elimination of a good deal of the physical scenery, a correspondingly greater amount must be achieved in other ways, for example, by light.

In the third scene, when Lincoln tells of the death of Ann Rutledge, the setting called for him to shuffle despondently up a flight of stairs to bed at the curtain. It was one of the most effective moments in the play, and it presented a real problem in simplification, since, of course, there were no stairs. The scene was restaged, so that instead of Lincoln making the exit, it is Bowling and Nancy Green who go out, carrying the light and dimming the light on the stage. Lincoln sinks exhausted on his couch, and after his friends have gone he raises his head. A blue light has been so placed that, as his face is lifted, his head and shoulders are outlined by a thin blue line against the blackness for a moment. Then he bows forward again and merges with the darkness as the curtain descends.

I believe—and in fact I have been told—this effect is no less moving than the original curtain.

Theatre in the Scenery?

This type of designing and lighting has not in the past and will not today start any revolution in the theatre; yet it bears important implications. Essentialization of stage settings spells hope not only for a popular dollar-top theatre but for more productions of all sorts of plays. We, the backstage craftsmen, stagehands, builders, and painters, will gain rather than lose from such an experiment as this new production of "Abe Lincoln in Illinois." We shall gain because the theatre's one chance of regaining its health is to encourage more producing of plays and to welcome back hundreds of thousands of potential theatregoers who have been locked out by that extra $2.20 in the price of orchestra seats.

The pertinent question for this vast new public to ask, therefore, is not "Is there any scenery in this play?"—for the moment you have actors on an elevated platform, frames in a proscenium, with telling lights focused upon them, you have the essentials of a setting. What they really want to know is whether the setting is dramatically effective and evocative of the play's main theme. Any producer who can give the right answer to the query "Is there theatre in the scenery?" will find the public responsive to the limit of its purse.

REDUCING SETTING TO CONCENTRATED REALISM is shown in this photograph of a Mielziner-designed scene from Robert E. Sherwood's "Abe Lincoln in Illinois," with Richard Gaines in the title role. Here the designer has used only such essentials as character-revealing lighting, a period sofa and two chairs (for actual sitting purposes), and a story-telling mantel-shelf and stove, to set the mood and character of the particular family at the particular period. Gone is the fussy elegance of mid-Victorial homes. (Photograph courtesy the Playwrights' Company.)



Modern Functionalism for Theatre Design

Successful Use of Equipment, Furnishings Depends upon Suitability of the Structure

BEN SCHLANGER
Architect

The successful use of any equipment or furnishing in a motion picture theatre structure depends to some measure on the suitability of the structure to its proposed use. The amount of importance to be attached to this thought is emphasized by the invitation to me, a theatre architect, to talk* to this group of equipment manufacturers, and further by the fact that so important a technical body as the Society of Motion Picture Engineers is devoting their fall convention next month to the design problems of the motion picture theatre structure.

This increased attention now being given to making the motion-picture theatre structure itself function more like the precise mechanisms you manufacture is indeed an indication of the long way the motion picture has gone to establish itself as a substantial industry. This is an unusual statement to make at this late date, when everybody has for a long time assumed the motion-picture industry to be quite substantial, but it is only in the last few years that a physical form for the motion-picture structure was accepted that followed exclusively the dictates of the functions of projecting and viewing motion pictures.

Yes, the motion picture is so well entrenched as an important industry that we no longer attempt to house so highly advanced a technology as the sound motion picture in a structure patterned after the requirements of the stage theatre.

The important differences between the requirements of the stage theatre and the motion picture theatre are many, too many to relate in this limited talk. Unlike a unit of mechanical equipment, it seems that a structure must enjoy long periods of amortization. Well, at last, it now seems that motion picture theatre investors will subscribe to allowing form to follow function and that proper periods of amortization are insured if this decision is made.

*Text of an address delivered before the convention of the Theatre Equipment and Supply Association, Inc., September 25, 1947, in Washington.

DESIGN DEVELOPMENT

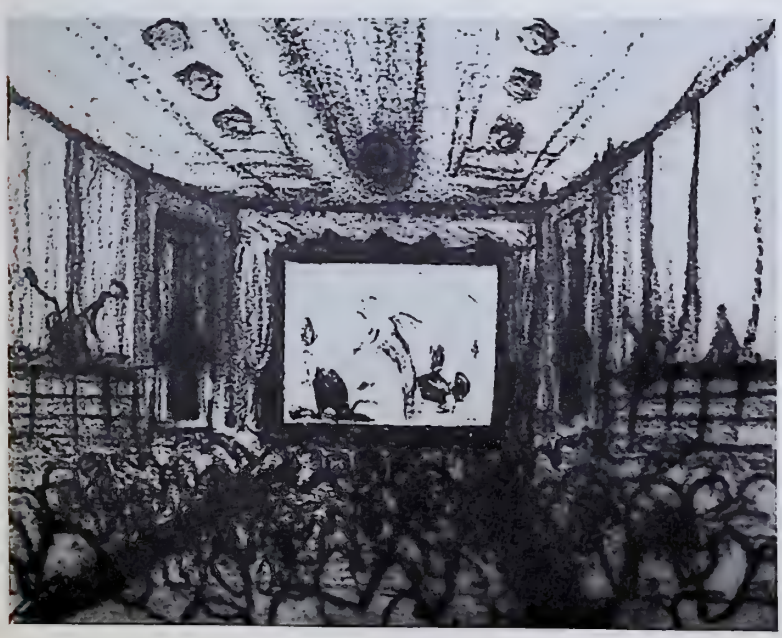
The proper development of motion picture theatre design does not take place the way a mechanism for the motion picture theatre is developed. There is no sponsorship for research in the theatre design problem as may be found in the manufacture and development of equipment. Yet the auditorium for motion-picture exhibition should be a precision instrument almost as much as the mechanisms used in it. Proper seeing, hearing and environmental requirements in addition to the ordinary economical and safety problems involved create intricate engineering problems. The individual architect shies away from doing the necessary research work, because he knows the difficult problem he will have in expecting his client to construct a theatre building according to the changes which this research may indicate as being necessary. I can sympathize with him after all these years of research work on my own. I imagine that if I had done some real serious thinking about fifteen years ago, I wouldn't have dared to follow the research course. It surely was an exciting challenge and still is.

In the period between approximately the years 1925 and 1930, when a considerable number of theatres was erected, and even after then, the exhibitors about to build a theatre had a difficult decision to make. This decision, as one might easily guess would be to determine what kind of theatre would best protect his investment for the longest practical period. Today we would say that the decision was easy to make, namely, that basically the theatre should provide excellent seeing and hearing conditions, physical comfort and pleasing architectural finish, that would not become outdated too soon. Then, however, the exhibitor thought that the important decision was whether the theatre auditorium should have blue skies, twinkling stars and outdoor pergolas, or whether his auditorium should resemble a ballroom of the French Renaissance era.

I recall about twelve years ago taking a prospective client to a theatre I had worked on which was in operation for several months to show him the finished product. I had given considerable thought to making this theatre function properly and had omitted superficial decoration and hoped that I had made a good impression on this exhibitor. He looked around for sometime and then remarked, "When will the theatre be finished?"

This incident tells a story because the exhibitor then was conditioned to believe that considerable superficial decoration was necessary if the theatre was to be commercially successful. This now has been proven to be a fallacy. Decoration is still to be found in theatre structures, but the tendency is towards using it in places where it does not conflict with the functioning of the theatre and where it is used it is of a practical type allowing for easy maintenance.

COMMON TYPE of screen end of a theatre auditorium reveals that the screen and the surroundings are too strongly contrasted and, accordingly, distracting. The screen appears too much like a picture which is much too far away. The tendency is toward using decoration in places where it does not conflict with the functioning of the theatre. It should be of a practical type, allowing easy maintenance.



DECORATIVE TREATMENTS

There are two types of decorative treatment suitable in the motion picture structure.

One is an optional type, the inspiration for which may be derived from any of the known historical architectural

styles or stem from recently developed modern architecture. This decoration can be used in any part of the theatre structure other than the auditorium proper.

The second type of decoration, if it can be called decoration, is surface texture that is created completely by the dictates of acoustical, visual, and psychological requirements as well as the necessity to create a suitable setting for the motion picture. For example, the architectural treatment of the auditorium interior can make a projected picture seem too small while the visual acuity of the same picture may prove satisfactory. An arbitrary architectural shape for the auditorium may prove very troublesome acoustically. Arbitrary decorative projections and reflective surfaces will create undesirable light reflections and indiscriminate artificial lighting sources will prove undesirable. This enumeration could easily be extended. While the required type of decoration is limited to being inspired by the functional requirements of the auditorium, this limitation is by no means narrowing to the creative designer.

NOW AND THE FUTURE

Actually, the exhibitor who is about to build a theatre today is fairly well fortified, technically speaking, in the sense that great advancements have been made which, if architects take advantage of them, will help him to produce a motion-picture theatre of a comparatively high standard. This is said, however, with a looking backwards attitude merely comparing conditions with earlier practice.

Some of the definite advancements that have been made are: better acoustical design, more suitable and flexible floor slope design for unobstructed vision of the picture, improved methods for staggering seat positions for unobstructed vision of the picture, better illumination levels during the picture projection period, better functional planning of the various related spaces in the theatre structure, efficient and effective air-conditioning, and many lesser improvements making for a better working unit.



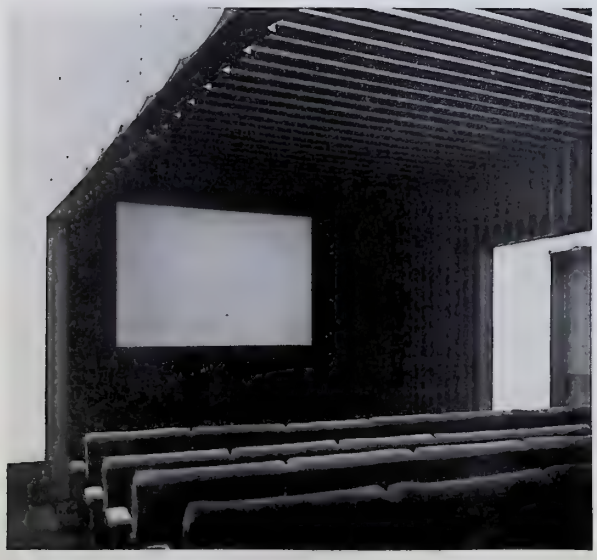
STUDY OF SCREEN END of an auditorium approaching neutrality, but not as yet perfected. Proper seeing, hearing, and environmental requirements, in addition to the ordinary matters of economy and safety, create intricate engineering problems. At last it seems that motion-picture theatre investors will subscribe to allowing form to follow function and that proper periods of amortization are assured.

There are two jobs to be done now.

The first important one is to get the information and proof of better motion picture theatre construction known as widely as possible and as soon as possible because we may expect a great deal of theatre construction as soon as government restrictions are lifted and building costs are leveled off.

The second job that we have is to find some logical sponsorship for research that is required to bring the standards of motion picture theatre design up to the point of modern mechanisms. It is unfortunate that this research work received so little organized sponsorship in the past because the money, effort, and physical properties that have been wasted because of lack of knowledge in this facet of the motion picture industry would, I am sure, prove astounding. I think, as I have said before, that recent indications look hopeful.

AN EARLY EXAMPLE is shown here of ceiling and wall texture designed to give neutral picture surroundings and to control screen light reflections from the wall and ceiling surfaces. While decorative types are restricted to functional requirements these limitations do not have to be narrowing.



THE EFFECTIVENESS OF LIGHT CONTROL. The bright spot on the ceiling and the board against the left wall indicates normal reflection of screen light from uncontrolled surface texture. Note the control of reflections otherwise. The light panel in the foreground is independently illuminated.



The Tacna: A Mode in Modern Cinema Design

Paramount International's First Building Is a 1,945-Seat House for Peru's Capital

ARMAND CARDEA
Paramount International Films, Inc.

The first new theatre to be constructed and operated by Paramount International Theatres Corporation, a subsidiary of Paramount International Films, Inc., is the modern, de luxe Tacna Theatre in Lima, Peru, which was scheduled to have opened late in December last year.

The Tacna is part of a newly erected ten-story building which includes apartments, offices, and de luxe shops. The structure is located on Tacna Boulevard, one of the principal thoroughfares of the Peruvian capital. The theatre itself, the first in Peru to be equipped with modern air-conditioning, will have a capacity of 1,945 seats, of which 883 are on the main floor, 405 de luxe chairs on the mezzanine, and 657 modern, comfortable, fully upholstered theatre seats in the balcony. The house is of fireproof construction, and all materials which might otherwise be inflammable have been thoroughly fire-proofed.

THE THEATRE

The Tacna Theatre will be an outstanding example of forward-looking motion-picture theatre design.

The materials and color scheme were selected from the standpoint of maintenance. The modern design throughout the Tacna Theatre stresses the simplicity of room surfaces whether they be wall, ceiling, or floor. Theatres in the past have relied to a large extent for their decorative scheme on out-dated imitation marble walls and the use of gilded plasters. With this in mind, the architects of the Tacna Theatre selected materials for their modern simplicity in design and their decorative effect.

The following is a general description by the architects—Schlanger, Hoffberg, Reisner, and Urbahn—on design aspects, materials used, and color scheme designated for the Tacna.

Outside the Theatre

The front of the theatre was designed with a maximum of glass to achieve openness and maximum of light. The marquee is an extension of the mezzanine floor cantilevered over the sidewalk. The facia and the soffit of the marquee are covered with white and gold mosaics. Parallel lines of neon tubing were designed to give the ceiling of the marquee an over-all glittering effect. A planting box with all-year flowers and shrubs runs the length of the marquee.

Above the marquee a large window admits light to the mezzanine and second balcony lounges. The second balcony is held back from the window line, thus providing an open well appearance from the floor of the mezzanine through the ceiling of the second balcony. A white satin drape with a sunburst pattern hangs in this well to be pulled across the large window areas if so desired.

A suspended light trough from the ceiling of the second balcony lounge is designed to throw an over-all intense glow upon a reflective ceiling surface which is visible from the outside.

THE TACNA THEATRE, in Lima, Peru, is the first new theatre to be constructed and operated by Paramount International Theatres Corporation. The theatre, part of a newly erected 10-story building which includes apartments, offices, and deluxe shops, faces Tacna Boulevard and will have accommodations for seating 1,945 persons on two levels. It will be the first air-conditioned theatre in Peru.



The Foyers

The ceilings of the inner and outer foyer are of the same color pattern mosaic as that of the marquee. The floor is coral terrazzo with white metal dividing strips. Walls are of a black marble with a rich pattern of color veining. The display frames for advertising are attractively designed as shadow boxes and are a part of the architecture of the walls.

Tempered glass doors lead to the inner foyer and the theatre proper. Opposite the inner foyer is a candy counter in red mosaic. The lounges, ladies' rooms, manager's reception room, main stairs to the mezzanine, and all aisles and crossovers in this theatre are carpeted. The carpet design is of an abstract pattern in colors of green, grey, black and white. From the first floor lounge a free standing curved stair leads to the mezzanine through an open stair well. Structural and decorative columns in the lounge are covered with gold and red mosaic.

The wall extending through the open stair well is covered with a metallic wall covering of bright orange. The wall opposite the auditorium is in vertical strips of white oak wood in a matte finish. The ceiling is a deep grey. The source of light is from an open cove in the stair well and through hat-lights recessed in the ceiling.

The front stairway leading to the second balcony is free standing and enclosed with tempered glass visible from the street. Attractive planting areas inside this glass enclosure and underneath this stair gives a feeling of openness.

The ceiling of the mezzanine and second balcony overhang are painted a soft coral red to match the color of the seats. The corrugated plaster of the audito-

rium ceiling is painted in a soft sea green. The contour curtain is chartreuse satin with a sunburst pattern.

Auditorium

The doors to the auditorium have a blue marble frame. They are covered with leather tufted with silver buttons with the lower half protected with lucite cover. Patrons will find the main floor appearing more or less level, with no uncomfortable downward slopes in walking in the aisles. An extraordinarily short stair climb leads to the upper seating levels.

In the aisles of upper level seating, there is only one step between the successive platforms of seating, in place of the step-and-a-half between seating platforms that has to be negotiated in the conventional theatre of earlier construction. This extra little step was eliminated in the Tacna design by the mild and comfortable upper level slopes.

The auditorium plan provides an excellent viewing and hearing position for every one of its 1,945 auditorium seats. No seat is placed too far from or too near the picture and not too much above the level of the screen or too much to one side.

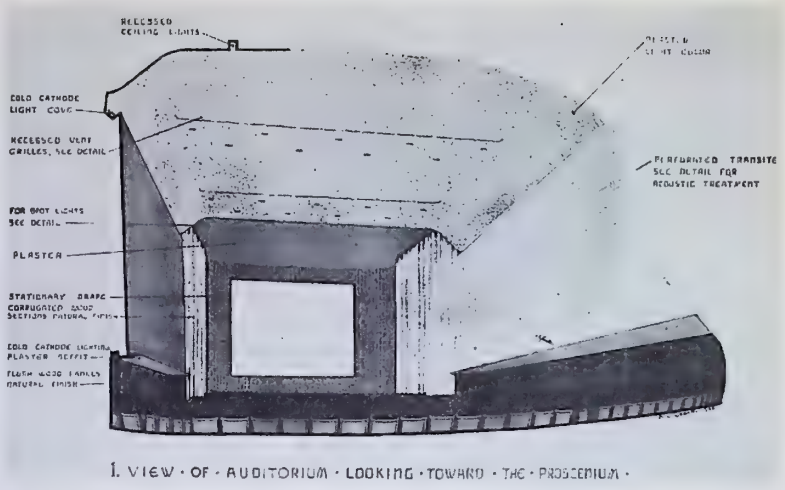
The Tacna has three levels of seating, the main floor, the loge floor, and the balcony floor. Each of the three floor levels is situated to afford the most comfortable viewing position. The motion picture screen appears to be at a level with the eyes of persons in any location. Seated in the balcony, the patron will not have a feeling of looking down at the screen as in earlier types of theatre design. Staggering of seats completely eliminates the blocking of vision which occurs when people are seated in front of each other. Ben Schlanger, theatre design specialist and one of the architects of the Tacna Theatre, was mainly responsible for the research behind this feature.

The comfortable and roomy seats, manufactured by The American Seating Co., are of the body-form type and are covered in coral mohair.

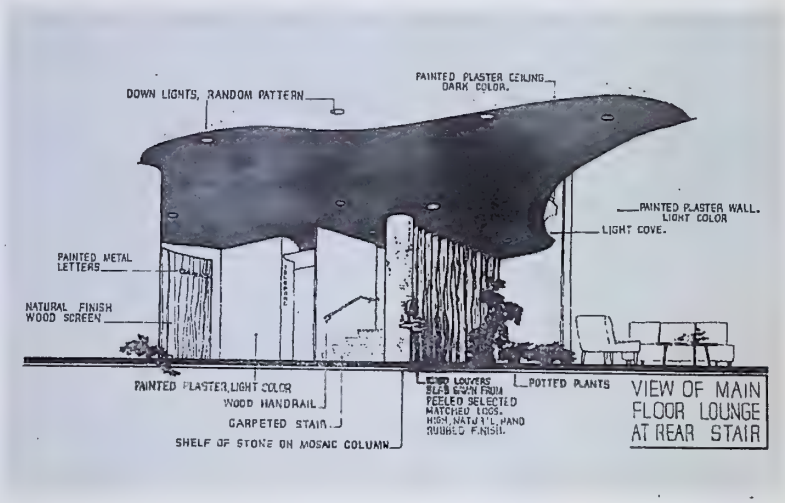
The auditorium proper has a dado wall at all the levels of white oak arranged in vertical battens. The walls above the dado are in neutral transite with small perforations to accomplish proper sound treatment. The rear standing wall is covered in dark brown leather and two structural columns are covered with a yellow gold colored metallic fabric. The structure of the orchestra floor and balconies is reinforced concrete, designed as a rigid frame to resist earthquakes. The roof consists of steel trusses with corrugated aluminum sheets.

One of the features of the balcony construction is the shallow depth of supporting girders, with over-hanging cantilevers, due to the unusual flatness of the balcony designs.

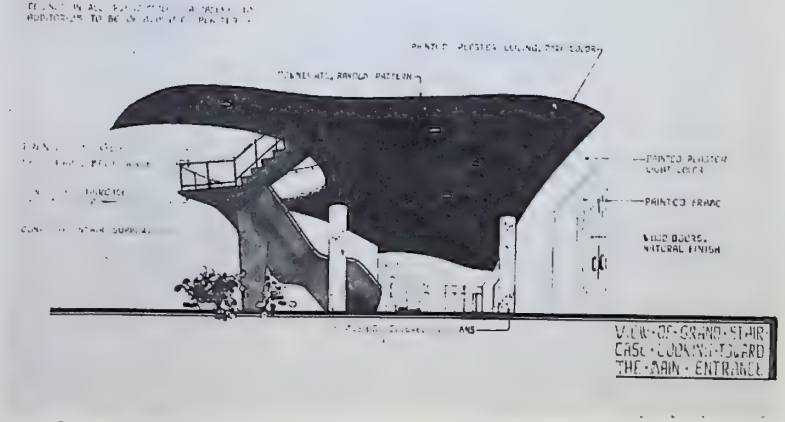
One of the Tacna's most unusual features is that it has no hanging or wall fixtures. The down-light type of fixtures, some 600 in number, are spotted in an over-all pattern in the main auditorium ceiling, mezzanine and second balcony soffits, and foyer, lounge and lobby ceilings. Neon cove lighting is used above the wainscoting in the auditorium and at mezzanine soffit. Lighting effects in the auditorium and orchestra spaces are soft and restful to the eyes. Exposed

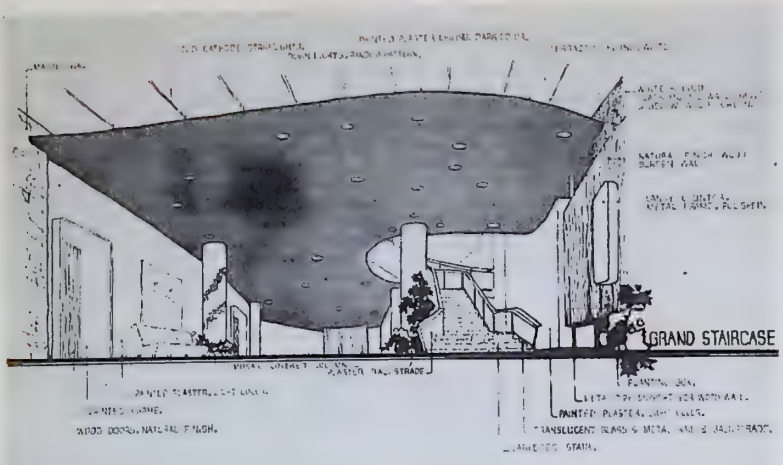


VIEW OF THE AUDITORIUM, looking toward the proscenium, is shown in the top picture. Here are indicated some of the details of the acoustical treatment and the lighting scheme. In the middle picture is given a view of the main floor lounge at the rear stairs. Here also the lighting is by a combination of cold-cathode lamps and downlights, the latter arranged in strictly a random pattern.

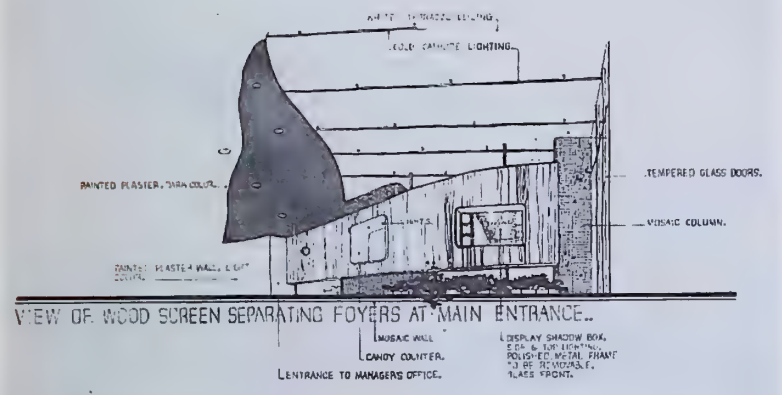


THE GRAND STAIRCASE is seen in the bottom picture, sketched from a vantage point looking toward the main entrance. The staircase is of concrete with a metal rail and balustrade, with translucent glass panels. Downlights in the ceiling are arranged in a random pattern. Columns in the area are mosaic-covered. Ceilings in all public spaces adjacent to the auditorium are of acoustic plaster.

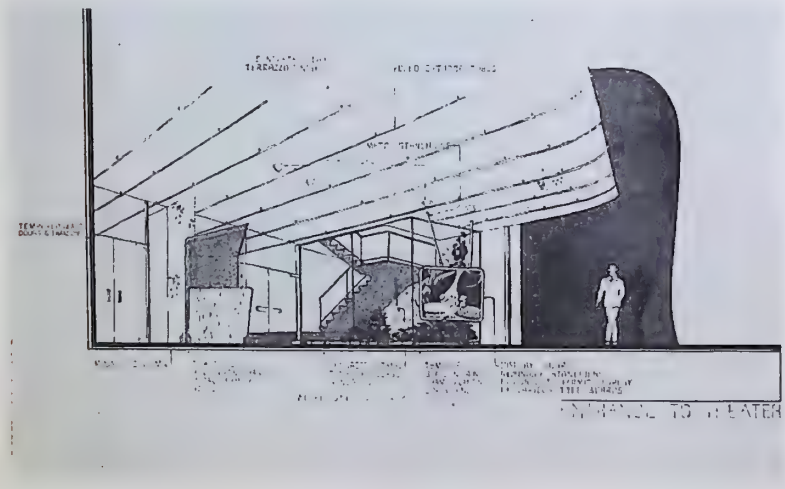




FROM THE MAIN LOUNGE, the grand staircase (above) is seen to advantage. The right wall is natural finish wood screen, while the opposite wall is plaster painted a light color. The wood doors have a natural finish. The middle picture shows the wood screen separating the foyers at the main entrance. The display shadow box has side and top lighting, with a removable glass front in a metal frame.



THE ENTRANCE TO THE THEATRE (below) has a ceiling of concrete slab with a terrazzo finish, with lighting by cold-cathode tubes and spotlights. The display board has removable stanchions designed to permit the most advantageous display of various types of boards. Tempered glass is used in the bronze frame behind which is a planting box. The ticket booth will have a marble base, metal frame.



light sources have been completely avoided. Cove lighting and concealed pocket lights throw an even glow of light on all of the surfaces with only a special accent of highlight on such important features as the main stair, displays, and featured architectural effects.

In the auditorium, a special type of corrugated texture on the walls and ceiling has made it possible to keep the coloring comparatively light. With this treatment, disturbing light reflection from the walls when the screen light is projected is avoided, yet the walls appear relatively light in tone during the picture show which is now considered a more comfortable surrounding than the dark effect used in the past. Leading doctors, specialists in eye comfort, and lighting experts have proved that this new approach to theatre auditorium lighting for motion picture exhibition makes it possible to view the moving picture with greater eye comfort.

The acoustical problem received the same meticulous care. Great advances have been made in recent years in motion picture theatre auditorium acoustics. Edward J. Content, a leading acoustical engineer, experienced in radio and theatre fields, in charge of all acoustical design for the United Nations Buildings, was the consulting acoustical engineer for the Tacna.

The walls and ceiling of the Tacna are specially shaped to diffuse and direct the sound energy. Care has been taken to introduce only such absorbing material as will reduce sound reverberation without changing or distorting sound quality.

Harry Rubin, chief projectionist and sound equipment analyst, was responsible for the layout of the projection booth, which has three Simplex projectors (with RCA sound) to guard against any interruption of the show due to breakdowns. The booth is equipped with a record turner so that records may be played during intermissions.

Stage and Proscenium

Beautiful sunburst satin screen and contour curtains, furnished by Premier Studios, of New York, enclose the screen and front curved contour of the stage platform. Curtain equipment was designed and manufactured by J. R. Clancy, Inc., of Syracuse, New York. Specially designed down-light fixtures, furnished by General Lighting Company, play on the curtain and stage. All these lights operate on a modern dimmer system designed and built by Frank Adam Electric Company, of St. Louis and New York.

Lounge and Rest Rooms

Special emphasis has been placed upon the comfort of the patrons who occupy the second balcony. In the past, this area customarily had wooden benches, poor or no toilet facilities, and very few conveniences. However, Tacna has provided the second balcony section with modern and spacious toilet and powder rooms, carpeted foyer and aisles, and a feature never before presented in that section: fully upholstered chairs. The same surroundings as appear in the other sections of the theatre can also be enjoyed by these patrons.

The Tacna has a lounge area and rest-room accommodations at each of its

three seating levels. Traffic to various parts of the theatre is made easier by three wide staircases that have short climbs. The manager's office is partly open to the public with an interviewing space for the patrons, and foyer and restroom is provided for women at each level.

The ladies' powder room opposite the first floor lounge has a very bright decorative pattern. A powder table of tufted white leather with silver buttons has a very large flesh-colored mirror from table top to ceiling. The mirror is lighted by a concealed reflective light.

The mezzanine lounge has a small candy bar that could easily be used for service of soft drinks. The walls are a combination of orange metal and natural white oak. A white satin curtain extends through two floors in an open wall and can be drawn across a large glass window that overlooks Tacna Boulevard. The facilities of the second balcony lounge follow the decorative pattern of the auditorium and mezzanine lounge.

The furniture for the Tacna was especially designed and built in Lima. It is in contemporary design, made of rich Central American woods combined with leather upholstery. Gay modern paintings in the various lounges add to the rich decorative effect.

Manager's Office

The manager's office is supplied with up-to-date RCA radio-phonograph equipment, provided with automatic record changer so that records may be played to furnish soft music through speakers placed in the foyers and lounges. The manager also has a microphone at his disposal so that he may make announcements to his patrons through the speakers of the radio-phonograph system as well as through the public-address system which is of a portable type and may be used on the stage for special events or announcements.

ASSOCIATED PERSONNEL

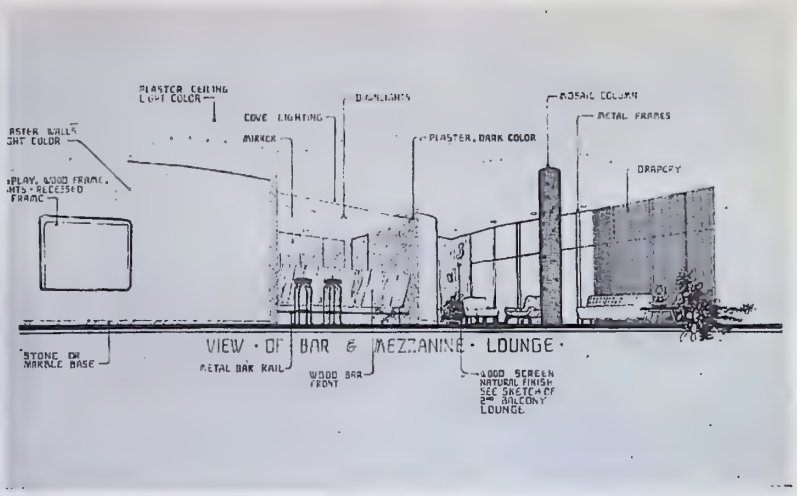
The owners of the entire enterprise are Inmobiliaria San Martin, S. A., headed by Manuel Gaboldoni, president, and J. Bayly Gallagher, director general. This company is comprised of prominent Lima business men.

Clement S. Crystal, vice-president in charge of Paramount International's theatre department and experienced motion-picture theatre builder, was instrumental in consummating the deal between Paramount International Films, Inc., and Inmobiliaria San Martin, S. A., for the erection of the Tacna. Also figuring in the early plans for the house was the late Osvaldo Urrutia, of Paramount Films of Peru, to whom the Tacna would have been the realization of a lifetime dream.

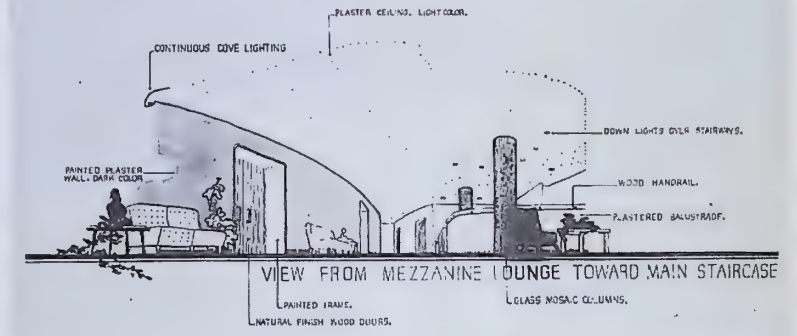
Arthur L. Pratchett, Paramount International Latin American division manager, was consultant in analyzing problems regarding proper booking policy, advertising matters and personnel setup.

In the designing of the theatre, the New York firm of architects, Schlanger, Hoffberg, Reisner and Urbahn (SHRU), acted in association with Florez y Costa, engineers and builders, of Lima, Peru.

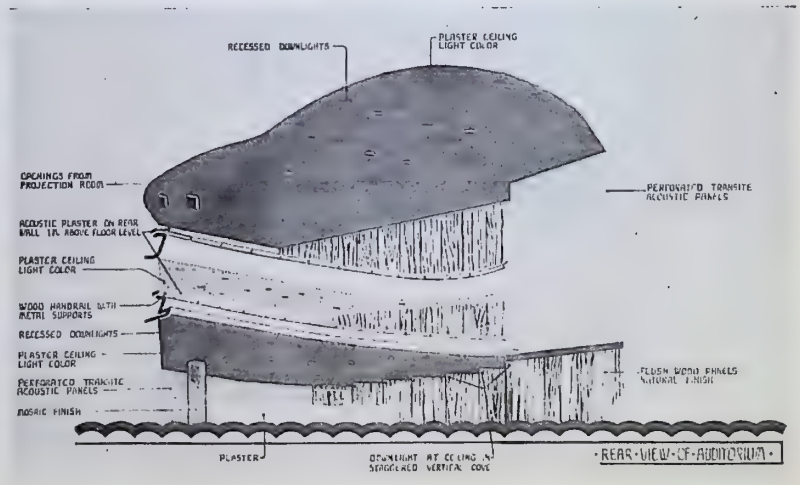
Carlos Costa, senior member of the firm of Florez y Costa, spent one month

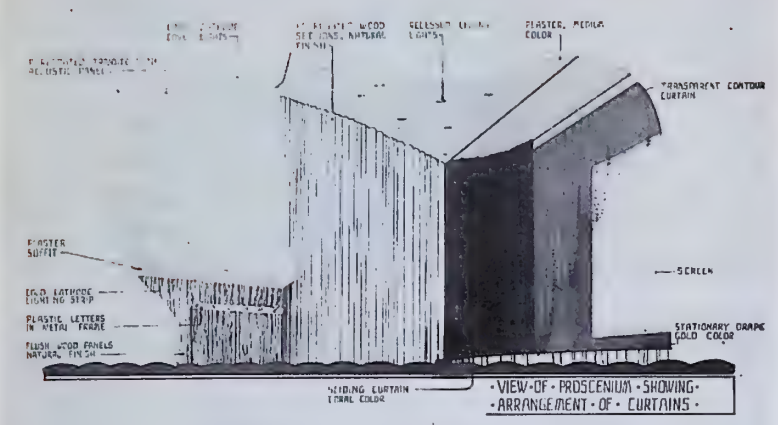


THE BAR AND MEZZANINE LOUNGE (above) has a light-painted plaster ceiling, with both cove- and downlighting. The bar is backed with a mirror, and the front is faced with wood. The view from the mezzanine lounge, looking toward the main staircase (middle), shows the downlights over the stairways. While the ceiling is light, the wall at the left is of a dark color. Wood doors are natural finish.

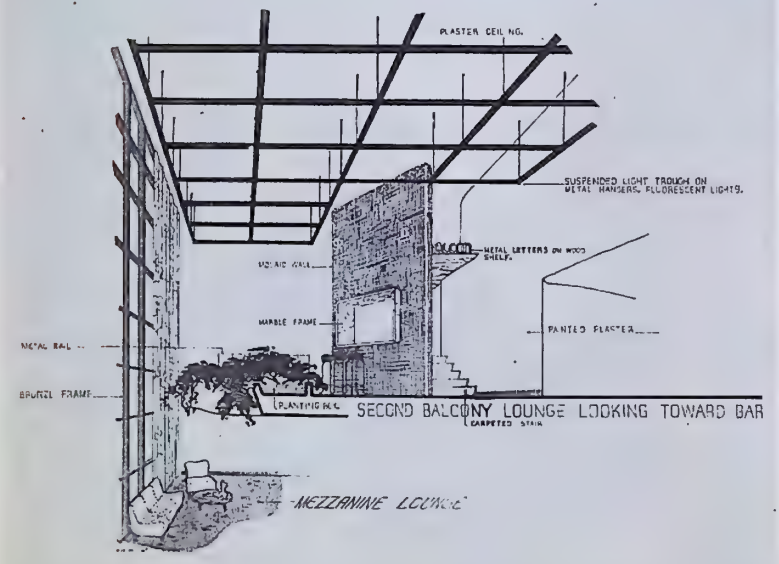


THE REAR VIEW OF THE AUDITORIUM shows the placement of the balconies (below). The rear wall is faced with perforated Transite acoustic panels on the lowest level and, on the upper ones, with acoustic plaster above 1 meter above the floor line. Lighting throughout the auditorium is by downlights. The side walls are finished with perforated Transite acoustical panels. Ceiling is of plaster.





THE VIEW OF THE PROSCENIUM (above) shows the arrangement of the curtains. Sunburst satin screen and contour curtains enclose the screen and the front curved contour of the stage platform. Specially designed downlights play on the curtain and stage, and are operated on a modern dimmer system. The contour curtain is transparent and the sliding curtain is coral, while the stationary drape is in gold.



in New York, acquainting himself with the latest ideas in architecture and materials in use in the United States. During this period, Costa was constantly working closely with Abe Platt, of Paramount's foreign theatre department, and he conferred often with the members of SHRU. As a result Costa was able to take back with him to Peru new, up-to-the-minute ideas on modern theatre construction and operation.

During Costa's visit to America, Clement S. Crystal and the architects reviewed with him the architectural details, color treatment, type of materials, and operational problems pertaining to modern theatre construction. Costa's advice on Peruvian practice and customs proved invaluable at these meetings.

In setting up the corporation for the Tacna Theatre, Roger Clement, general counsel for Paramount International Films, Inc., handled all the legal matters, cooperating with Doctor Grau, of Lima, Peru, who verified the details so that they complied with Peruvian law.

The financial structure of the Tacna Theatre Company is supervised by Milton Kirshenberg, treasurer and comptroller of Paramount International Films, Inc., and treasurer of Tacna Theatre Company. By his guidance, all payments for supplies and equipment are properly made both in the States and in Lima, Peru.

Westinghouse Electric International Company designed the layout of the air-conditioning system. Mercatoria, S. A., of Lima, Peru, agents for Westinghouse, have the contract for the equipment and installation. Evan Perkins, Paramount's construction head, cooperated with the Westinghouse engineers to give Lima patrons the best in air-conditioned comfort.

All matters pertaining to safety and insurance have the approval of Henry Anderson, who is Paramount's expert and adviser in safty codes.

The various purchases for equipping the theatre were handled by Harry Nadel, of Paramount's purchasing department.

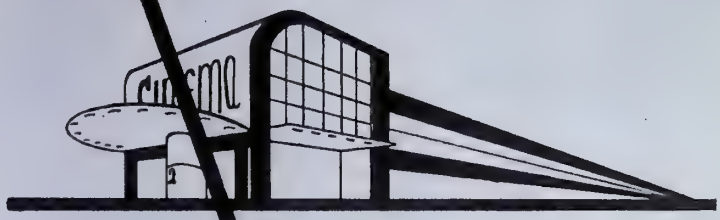
William Fass, of Paramount International Traffic Department, was invaluable in handling the complicated job of shipping the various items to Lima. This job included the obtaining of import and export licenses, consular approvals, packaging, crating, and arranging for space aboard ship.

Some of the heavy items that had to be fabricated in New York and shipped to Lima were the marquee attraction boards and large building signs which were manufactured by Continental Sign Company, of New York. The silhouette letters for these signs were manufactured by Adler Silhouette Letter Company, of Chicago, Illinois.

The delivery of the furnishings for the Tacna Theatre is under the jurisdiction of Eugene Goodman, who went to Lima in February, 1947, to coordinate the details of checking the delivery of equipment and supplies. He also has acted as liason between Florez y Costa, Inmobiliaria, San Martin, S. A., of Lima, Peru, and Paramount International Theatres Corporation, of New York. Goodman will be the general manager of the Tacna Theatre, and since his arrival in Lima did an expert job in making preparations for the gala opening.

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CONSTRUCTION and MATERIALS

1947-48

The Need for Modernizing Building Laws

The Nature of the Problem and Its Solution Require the Objective, Aggressive Approach

CALVIN H. YUILL
Construction Division of the Office of Domestic Commerce, United States Department of Commerce

There is general agreement among architects, engineers, builders, and others in the building construction industry that building laws should be modernized.* They are thwarted by unwieldy and costly administrative procedures established by law, rigidities that prevent the use of new buiding materials and methods of construction, requirements that vary from one community to another, and specifications that call for the use of more material than is needed in modern practice.

The public, too, realizes the need for corrective action. Indignation over the loss of life in the recent hotel fires brought about a demand for greater safety in buildings culminating in the President's Conference on Fire Prevention.

The long accumulating shortage of housing, the backlog of industrial and commercial construction, and the desire for full employment are also factors in the current interest in improvement in building laws.

NATURE OF THE PROBLEM

Broadly speaking, progress in the field of building law has been characterized by uncoordinated and often conflicting action and by a failure to take into account the full economic and social implications of the problem. Those familiar with the nature of the building construction industry will appreciate the reasons for this. While much has been done, lasting results will depend largely on the ability to analyze in detail the nature of the problem and to organize existing resources in a program of action.

Purpose, Scope of Building Law

The substance of building laws is not always consistent with their stated purpose and scope. For example, since the safeguarding of human life is the primary purpose of a building law, it may not be in the public interest to include provisions for the protection of investments in buildings and their contents or for promoting particular products.

The scope, as stated, in many laws is not covered by the detailed provisions. For example, trailers and boats used for housing or otherwise are sometimes included in the scope of a law but are not covered specifically.

Lack of precise definitions and loose draftsmanship are misleading. They increase the burden on the building official and confuse those affected by the law.

Application to Existing Buildings

As the need for a greater degree of safety in buildings is demonstrated through disaster, building laws are amended to require the installation of new safety measures. Generally, however, if the installation of these measures in existing buildings involves considerable expense, the law is not made retroactive. Thus, it has become common practice to permit the use of old buildings in which the safety standards are less adequate than those required for new buildings. Some municipalities have taken aggressive action in the matter. Their experience may provide the basis for obtaining greater safety in existing buildings elsewhere.

Multiplicity of Laws

In any municipality, there may be a plumbing law, electrical law, elevator law, boiler law, fire-prevention law, and possibly a housing law, in addition to the "building law." All of these, as well as parts of the health code, set forth requirements for construction, occupancy, maintenance, and demolition of buildings. State labor laws may also regulate to some extent the construction and maintenance of buildings in which persons are employed. All of these laws may be administered by different agencies of state and local government.

A comprehensive program for the modernization of building law must include careful review of the existing situation, with regard to the social and economic elements involved, and consideration of how to combine, administratively and otherwise, the many laws that regulate buildings. Until such twofold action is taken, we shall continue to have building regulations made up of uncoordinated, often over-lapping and sometimes conflicting laws, ordinances, and regulations which confuse the builder and frustrate the administrator.

Referencing and Publication

Local acceptance of standards for materials and workmanship and of standard test procedures developed by private and public agencies results in the elimination of substandard materials and practices and the utilization of scientific research not otherwise available. It also reduces the cost of printing the local law. Instead of incorporating the entire text of the desired standard in the law, it can be, state legislation permitting, referenced by title, date and originating agency.

Methods for incorporating these standards into building law by reference vary

*This discussion has been reprinted from the June, 1947, issue of Domestic Commerce.

THE NEED for modernizing building laws is perhaps best illustrated in the legal history of Quonsets when employed as the skeleton for theatre auditoriums. Although many Quonset theatres have been built—and more are on the way—there is no unanimity of opinion on the admissibility under the codes. Nor can always the size of the community be taken as the criterion of possible approval.



widely. In some instances, local practice is not in agreement with the state laws. Frequently, the reference to standards is incomplete or out-of-date.

To aid localities in examining existing laws, the Construction Division has prepared a "Work Sheet for Checking the Dates of Standards and Specifications Incorporated by Reference in Building Laws" (C. D. 2) showing the title, date of publication and originating agency. This publication can be obtained upon request to the Construction Division, Department of Commerce, Washington 25, D. C.

Closely allied to the problem of referencing is that of publication. A particular state may require that a building law must be published by the municipality in a newspaper, bulletin, by posting or otherwise before it becomes effective. Depending on the form of publication required, the cost may be large enough to affect adoption of the law.

Various means have been suggested for meeting this obstacle ranging from publication of a notice that copies of the law are available for public reference to the grant of power to reference standards "as amended" or to accept standards of specified agencies. As in referencing, the latter proposals involve the delegation of legislative authority and legal aspects of the problem should be considered carefululy before action is taken.

New Materials and Methods

Building law can be written so as to encourage progress within the industry as well as to provide greater benefits to the consumer. In one community, the administrative unit is authorized to accept new or alternate materials or methods providing they meet acceptable standards and that rules for their use have been issued. In another, however, new products not specifically provided for in the local law cannot be used until the law is amended by the legislative body—often a long and tedious process.

Pre-fabrication has produced new problems that cannot be treated satisfactorily in the traditional manner. For example, how is a building official to examine and approve a complex mechanical assembly or a pre-fabricated structure manufactured hundreds of miles from his office? And having once approved such a unit, how can he be assured that additional units will meet the same standards? Acceptance by the official of certificates of compliance from the manufacturer, from a recognized inspection service, or from a registered architect or engineer have been suggested by the translation of such a solution into law requires initiative and skill.

Two Types of Building Law

In recent years some leaders in the building law field have advocated a separation of the component parts of the law so that the administrative unit shall be authorized to promulgate rules and regulations traditionally included in the law itself. In other words, the legislative branch creates the administrative unit, defining its powers and duties, and states requirements in terms of results to be obtained, that is, a wall of a particular building shall have a four-hour fire resistance rating. Any material or method of assembly may be used that satisfies the performance or functional requirements under regulations prepared by the administrative body.

Advocates of this type law claim that it will permit the use of new materials and methods without legislative action, that the total law governing construction can more easily be kept up-to-date and that unncessary restrictions can be eliminated.

Quality of Administration

While a building law can minimize the dangers of abuse, it cannot completely eliminate them. In a large measure, effective enforcement depends upon the qualifications of the administrative personnel and upon the appropriation of adequate funds. The former can be controlled to some extent in the law. The appropriation of funds, however, usually is a matter of separate legislation.

Uniformity of Building Law

Finally, requirements in different localities vary greatly. Permissible floor loads, allowable stresses of steel, and thickness of walls are a few examples of items for which requirements vary. The effect on volume production and costs is obvious. This situation, together with the lack of protection in many areas, gives rise to the interest in state building laws administered by local officials.

These few examples will suffice to show the nature and complexities of the problem and demonstrate the need for courageous action.

WHAT HAS BEEN DONE

In preparing a list of "Publications Relating to the Preparation and Revision of Building Laws" (C. D. 1), available on request to the Construction Division, Department of Commerce, Washington 25, D. C., the Construction Division has found a large number of organizations and individuals interested in the problem.

Model laws have been developed by the National Board of Fire Underwriters, the Pacific Coast Building Officials Con-

STRUCTURAL STEEL CONSTRUCTION of the kind shown here is the type probably universally acceptable for use in the erection of theatres. In the larger cinemas, naturally, this kind of construction is always indicated, but in the case of smaller houses it is expensive and not infrequently is the very factor that prevents the erection of theatres in communities where potential patronage is limited.



ference and the Southern Building Code Congress among others. Many communities have adopted these model laws in whole or in part.

Although developed along traditional lines, fuunctional requirements to a certain extent have been introduced into the most recent editions of these model laws. The great majority of building laws in effect today are of this composite type.

Model Building Law

Since 1935, the American Standards Association through its Building Code Correlating Committee and with the co-operation of the National Bureau of Standards has been drafting component parts of a model building law. When these parts are complete, it is proposed that they be combined and correlated to form a model law that can be adopted throughout the country with modifications as needed for climatic reasons. To date, five of the 17 basic chapters have been completed and some of the material already has been incorporated in the revision of local laws.

The Building Officials Conference of America, Inc., is preparing a model building law which adheres more rigidly to the performance principle. It proposes a basic law to be adopted by the legislative body which in part will authorize the building official to promulgate rules and regulations. A model construction code (rules and regulations) is also being prepared by the BOCA and will be offered for adoption to the building official in looseleaf form. The basic law is to be written in performance terms while the construction code will be specific in defining the methods to be followed. The BOCA has organized a Building Officials Foundation to promote the adoption of this model law and to provide related advisory service to municipalities and building officials.

A New Approach

Also significant is the Uniform Building Code published in 1944 by the Committee on the Correlation of the Building Industry sponsored by the Massachusetts Institute of Technology. This proposal would create a State Department of Public Safety and the office of Commissioner of Public Safety. The Commissioner as a part of his duties would prepare rules and regulations with respect to the design, occupancy and construction of buildings and other structures, applicable throughout the state. In every city or town, singly or in combination, there would be a locally appointed Superintendent of Buildings. Primarily, enforcement of the rules and regulations would be on the local level.

On a more localized scale, much time and thought has been given to the preparation of model building laws by such groups as the New England Building Officials Conference, the League of Wisconsin Municipalities, the Tri-County Regional Planning Commission of Denver, Colorado, the Association of Washington Cities and others. The Connecticut State Housing Authority recently has published a State Building Code that may be adopted by any municipality within the state.

The Suggested Basic Building Code for Washington Cities suggests a method for placing the responsibility of compliance with building law on the architect or engineer. Under the plan, the architect or engineer certifies that the structure built under his supervision complies with the law and no inspection is required. While this proposal has evoked protest, it is not uncommon in modified form in some of the latest building laws.

Group Developments

Many parts of building laws have been developed by technical groups. The Building Exits Code of the National Fire Protection Association, the Manual of Accident Prevention in Construction of the Associated General Contractors of America, the Plumbing Code of the National Association of Master Plumbers, the National Electric Code of the National Board of Fire Underwriters are a few examples of such specialized codes.

Standards and specifications relating to the quality of materials and workmanship, testing procedures and safety codes have been developed by the National Bureau of Standards, the American Society for Testing Materials, trade associations and other agencies. Many of these standards have been approved by the American Standards Association and their adoption encouraged as a means of promoting uniformity. The National Bureau of Standards for years has conducted research and tests on building materials and methods and has encouraged the modernization of building laws.

FORMULA FOR SUCCESS

None of the basic problems and conflicts outlined in this article would appear to present insurmountable obstacles. All could be resolved through an approach sufficiently objective, well qualified and adequately financed as to engender the confidence of industry, state and municipal officials and the public at large.

Major elements of such an approach are these:

(1) Unbiased leadership with the independence and courage necessary to adhere to the prime objective;

(2) Clear understanding of the economic, social and legal implications of building law modernization;

(3) A scientific approach through which existing data can be obtained and evaluated and original research undertaken where necessary;

(4) Co-ordinated action with those agencies producing engineering standards and tests and with aid in the acceleration of those activies; and

(5) A promotional campaign sufficiently aggressive to overcome public apathy and inertia and the resistance of specialized, self-interested groups.

To a large extent, the solution lies not in the development of new techniques and the enactment of more law but rather in perfecting and extending the application of existing law. State enabling legislation should be amended where necessary to take full advantage of established methods. Provision should be made for the testing, inspection and use of new materials and methods. Codification of related laws should be given careful consideration. Immediate steps should be taken to obtain more adequate enforcement. Unbiased and competent assistance should be sought and utilized.

A program of this nature is entirely realistic, if existing resources are organized with the basic objective in view.

ANOTHER CONSTRUCTION IDEA which might occasionally run afoul of building codes is the use of pre-cast vermiculite slabs, as shown here. As with the Quonset, the technical data indicate use: but the development is so new that building codes, so far back of advanced thoughts of ways and means of low-cost construction, cannot be properly interpreted to permit a forthright approval of the new ideas.



Quonsets in Low-Cost Theatre Construction

The Arch-Ribbed Structures Are Redesigned And Engineered to Meet Codes Requirements

HERBERT K. LEWIS
Stran-Steel Division of the Great Lakes Steel Corporation

The past year has seen the Quonset "catch-on" in the theatre industry as the basic part of a low-cost, attractive movie house particularly suited to the small community.

TREND TO QUONSET

The trend toward Quonsets for small-community houses perhaps may be best observed in results of a survey by the manufacturer which disclosed that, as of this past fall, at least 21 such theatres were in operation, 16 others were building and plans for 10 others were on the drawing boards. In view of the fact that approximately two-thirds of the country's Quonset dealerships did not participate in the poll, it can be fairly reliably estimated that the actual number of such theatre projects—operating and planned—now exceeds 60.

On the basis of these figures and of hundreds of inquiries received by the building manufacturer concerning its adaptation for theatrical use, it is evident that the Quonset definitely is meeting one of the industry's needs.

These factors have developed during the past 12 months further to stimulate this use of the arch-ribbed structure: (1) the Quonset's acceptance by the public has increased, as is evidenced by the increasing numbers of these buildings which are being erected throughout the country for many varied uses; (2) recognition of the building's virtues by the architectural profession, and development by its members of standardized plans and equipment to achieve a truly low-cost theatre; and (3) improvement of the basic building itself by the manufacturer.

BASIC IMPROVEMENTS

In discussing the latter point, it should be recalled that the Quonset was developed as a wartime structure when speed was paramount. Research which had proved the arch-rib as the form best qualified to meet exacting military requirements has been resumed, now toward the objective of furnishing peacetime Quonsets for use on a world-wide basis. This meant redesign and engineering the structures to meet the many variable requirements found in different building codes.

Two changes in the building specifications are of importance to their use as theatres. These are the adoption of a high tensile strength alloy steel for framework, and doubling of the building's ribs whenever additional strength is required or indicated by climatic and structural-load factors.

High Tensile Alloy

All Quonsets in the 40-foot width, the dimension used for theatres, now have arch-rib framework of N-A-X low alloy, high tensile steel. N-A-X high tensile has approximately twice the strength and four times the corrosion resistance of ordinary structural steel. This means added building life.

Concerning structural requirements in various localities, it should be explained that in view of the differing geographical requirements in two sections of the country, the sections have been designated by the Quonset manufacturer as Zones A and B. Zone A consists of Alabama, Arizona, Arkansas, California, North Carolina, South Carolina, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Mississippi, Missouri, Nebraska, New Mexico, Ohio, Oklahoma, Tennessee, Texas, Utah, Virginia, West Virginia, and the District of Columbia. Zone B is comprised of the remaining states, whose more severe winters bring heavier snow and ice loads.

Stronger Design

The Quonset 40 is produced in two types, A and B. Each type is specified for the respective and differing requirements of its corresponding zone. The B type differs from the A in that it has additional bridging and purlins in the framework.



THE MELODY THEATRE, Port Hueneme, California, was designed by Loy L. Smith for M. C. Kennedy, P. E. Smith, and F. H. Eddington. The theme of the design was an echo of the Quonset half-moon by a horizontal half-ring (open) marquee and half-round store fronts. Cost of the structure alone was $40,000, including fees and financing, and cost of equipment was $25,000. Auditorium is seen below.



With the adoption of Quonsets for theatres and similar uses in which plaster, stucco, insulation, or acoustical materials, separately or in combination, are applied to the interior, it became advisable to provide support for additional dead load. The manufacturer, therefore, specified that all Quonset 40 buildings in A territory on which plaster, stucco, and insulation board are to be applied shall be standard B-type buildings, and that when the interior treatment exceeding 4 pounds to the square foot of interior surface is applied to buildings in the B Zone, all such buildings shall have double ribs spaced at approximately 4′-0″ centers. The manufacturer further advised that whenever the interior ceiling and sidewall treatment exceeded 10 pounds to the square foot, its district engineers should be consulted.

In those cases in the B Zone when the weight added is less than 4 pounds to the square foot, the standard B-type Quonset with single ribs may be used.

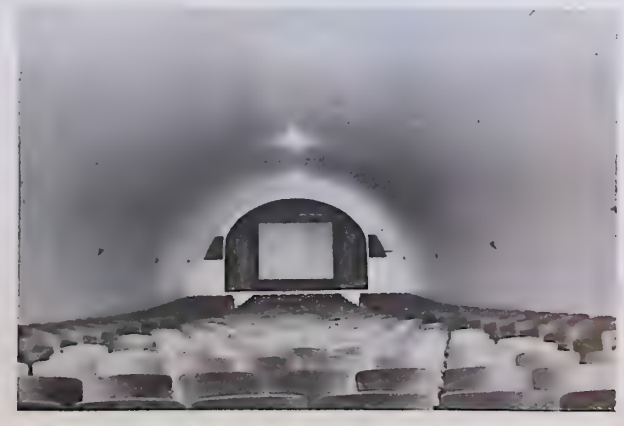
QUONSET ADAPTATIONS

Simultaneously, a number of architects, independently of the manufacturer, have incorporated their own ideas into Quonset adaptations. For the most part, their initial efforts have been directed toward erection of masonry in front of the Quonset to house box office, foyer, and restrooms, and sometimes to conventionalize the Quonset shape. More re-



THE SILVER CITY THEATRE, Alexandria, Louisiana, was designed by Dunn and Quinn for C. R. Haynes. Total cost of the 700-seat house was $60,000. Face-brick masonry construction is used for the front portion, housing the office, lobby, restrooms, confectionary concession, and projection booth. The theatre is cooled by a washed-air unit located in a separate building at the rear. Natural gas heat is provided for winter operation. Throughout the building is insulated with cotton batts. The Quonset 40 portion is 140 feet deep. Two auditorium views are given.







THE DRAIN THEATRE, Drain, Oregon, was designed by Ted Francis for Golda Woolman. The 396-seat theatre was completed, even to the installation of a sweet shop with soda fountain, for approximately $38,000. The Quonset 40 section is 80 feet deep. The exterior is finished in white stucco and has an overhanging marquee edged by colored neon in the soffit. The auditorium (below) has a sloping floor with the seats laid out with a large central section and two smaller side sections. The candy counter (below) is centered between the doors to the auditorium.





cently, however, the trend is to take advantage of the curved shape as an unusual and pleasing front that attracts attention and business, and further provides construction economies. This is achieved by placing the box office, foyer and associated rooms within the Quonset, thus minimizing the additional materials required.

Interest by theatrical architects in Quonsets is welcomed by the manufacturer. In fact, the manufacturer recommends that a qualified architect or engineer—or both—be retained for design of the adaptation most suited to the location and business problems involved with each installation. The services of such experts, it is pointed out, enable the building owner to make use of all economic advantages of the basic building, give its interior and exterior the proper architectural treatment which will attract patrons and win community pride in the structure, and last but not least insure against improper erection and misuse of the building's component parts in applying finishing materials and installing equipment.

Such architectural services already are available at minimum cost from at least two sources. E. C. A. Bullock, New York theatrical architect, has prepared plans for several sizes of theatres which are discussed in detail elsewhere in THEATRE CATALOG.

Similar plans have been prepared by





THE METRO THEATRE, Abiline, Texas, is a Quonset 40 adaptation designed by the owner's architect. With the adoption of Quonsets for theatres and similar uses where plaster, stucco, insulation, or acoustical treatment, separately or in combination, are applied to the interior, it becomes advisable to provide support for the additional dead load. The manufacturer specifies that such Quonset 40 buildings in A territories shall be of the standard B-type buildings, and that when interior treatments exceed 4 pounds to the square foot the buildings shall have double ribs.

Myles E. Belongia, Milwaukee architect, and are available through Ben B. Poblocki and Sons Co. of Milwaukee, theatre equipment suppliers, also discussed in this volume.

Plans such as these are, of course, standardized. In many cases, minor changes by local architects may be advisable to better fit the resulting building to local conditions and requirements.

CONSTRUCTION COSTS

Early experience in adapting Quonsets for theatres taught the lesson that auditorium economies possible in this type of construction easily can be dissipated by the unwary in other portions of the building and equipment. Simultaneously, however, it was learned that Quonsets are truly permanent structures which can be made as elaborate as desired.

These statements are attested by Melvin C. Glatz, purchasing agent for the Fox Inter-Mountain Amusement Corporation of Denver, Colorado, in commenting on his experience with that firm's 670-seat Quonset house in the suburb of Aurora. This was one of the first such buildings erected, and was completed with elaborate detail at a total cost of $165,000. "Engineering for completion of the interior was lacking and there were too many things that had to be improvised and worked out on the job," Glatz said. "Our costs ran as much as a masonry building. However, I do believe that the life span of the building will be equal to that of masonry construction.

"We have no complaints and have had no trouble with the building itself. The way the building is insulated we have less heat loss than in normal brick or masonry construction. There has been no maintenance on this building."

It is noted that, as far as can be ascertained by diligent inquiry, no other Quonset theatre installation has approached the cost of the Fox Aurora. The average complete cost of the Quonset theatre, based upon reports from nine operators (including the "high-cost" Aurora) who replied to questionnaires, is $125 a seat.

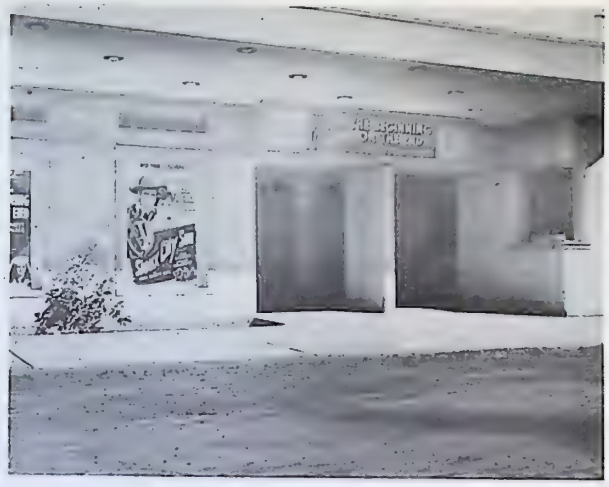
Most of the structures referred to in the preceding paragraph were built prior to availability of the previously-mentioned architectural drawings for low-cost theatres. The theatres and reported data follow:

	Number of Seats	Total Cost	Cost Per Seat
Fox, Aurora, Colo...	670	$165,000	$246
Keiser, Keiser, Ark.	500	27,000	54
Coleman. Coleman, Wis. ...	400	55,000	137
M and R, Cave Junction, Ore. ...	460	35,000	76
Ken, Frankenmuth, Mich.	400	75,000	187
Drain, Drain, Ore...	400	38,000	95

THE KEISER THEATRE, Keiser, Arkansas, was designed for Roy Bolick. The building was constructed, after four months of work, at a cost of approximately $27,000, with the structure and its brick-faced front costing about $17,000 of this amount. The lobby is confined to a space 10 by 16 feet. Insulation is Celotex. Ventilation is by a blower with an intake near the left of the screen. Heat is provided by an oil-fired blower. The owner states his theatre is sufficiently warm in winter and in summer is cooler than any brick or block building. Quonset 40 portion is 100 feet in length.

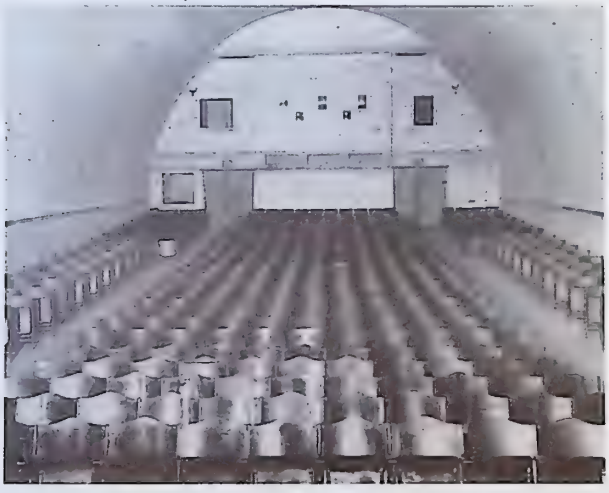


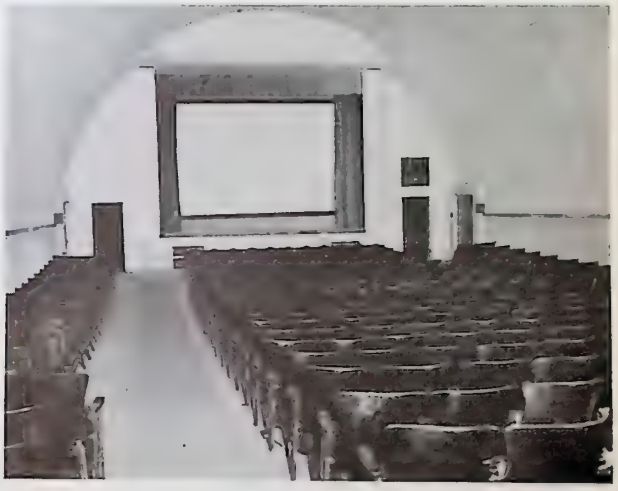






THE M & R THEATRE, Cave Junction, Oregon, was designed by James K. Hoey for W. B. Roberts. Masonry for the front (upper pictures) and interior lobby partition is of locally-manufactured pumice tile. The supporting side walls and floors are of reinforced concrete. The insulation is Kimsul. The auditorium finish (lower picture) is Firtex ¼ inch thick. The cost, exclusive of equipment, for this 460-seat theatre was approximately $25,000. Owners of theatres utilizing the Quonset 40 have been unanimous in their praise of this easy means of low-cost construction.





Crystal, Crystal, Mich.	400	38,000	95
Silver City, Alexandria, La.	700	60,000	85
Melody, Port Hueneme, Cal.	400	65,000	162

Average Cost Per Seat.....$126

OTHER FACTS

Actual experience in Quonset theatre operation has brought out two important facts which may surprise those not so closely acquainted with these buildings. One is that the structures have excellent acoustical properties. The other is that operators have discovered them more easily heated in winter and cooled in summer than conventional buildings.

For example, RCA tests of sound equipment in the Middleton, Wisconsin, theatre rated "infinity." And from the Melody theatre at Port Hueneme, California, comes this word: "The shape produces perfect acoustical results, proof of which is acknowledgement by patrons in constant increase of box office receipts."

Reporting on his theatre at Keiser, Arkansas, Roy Bolick says: "The Quonset was easily heated last winter, and the temperature was quite comfortable during the summer without any cooling device." This point also has been mentioned concerning the Fox Aurora.

QUONSET'S ROSTER

A partial listing of Quonset theatres now in operation follows:

Location	Theatre and Owner
Arkansas, Keiser	Keiser, Roy Bolick
California, Port Hueneme	Melody, M. C. Kennedy, F. H. Eddington, and P. E. Smith
Colorado, Aurora	Fox, Fox Inter-Mountain Amusement Corporation.
Iowa, Mediapolis	Mediapolis, J. R. Glesne
Louisiana, Alexandria	Silver City, Silver City Theatres
Michigan, Crystal	Crystal, Marshal Straight
Michigan, Frankenmuth	Ken, Albert Wakeman
Missouri, Kinlock	Lincoln, Lincoln Theatre, Inc.
New York, Inlet	Gaiety, Morris Shulman
Oregon, Ashland	Ashland, W. B. Roberts
Oregon, Drain	Drain, Golda Woolman
Oregon, Mill City	Mill City, Robert Vaness
Oregon, Cave Junction	M and R, Messrs. Musil and Roberts
Pennsylvania, Millville	Millville, Begnar Brothers
Texas, Abilene	Metro, Metro Theatre
Texas, Big Springs	Rio, Big Springs Theatres, Inc.
Texas, Mathis	It, Gidney Talley Enterprises
Texas, Ozona	Ozona, W. V. Adwell
Texas, Winnie	Gem, W. R. Armstrong
Wisconsin, Coleman	Coleman, Norbert Wettstein
Wisconsin, Middleton	Middleton, Joseph Rupp

Semi-Prefabrication with the Quonset 40

Three Basic Plans Presented for Theatres With Capacities of from 415 to 725 Seats

E. C. A. Bullock
Architect

In recent months considerable interest has been manifested in the building of pre-fabricated theatres, due primarily to the excessive cost of building in the conventional manner and the urgent need for new theatres in many locations. Such interest has resulted and been further developed by the construction of several theatres of a semi-prefabricated construction in different parts of the United States, which are already in operation.

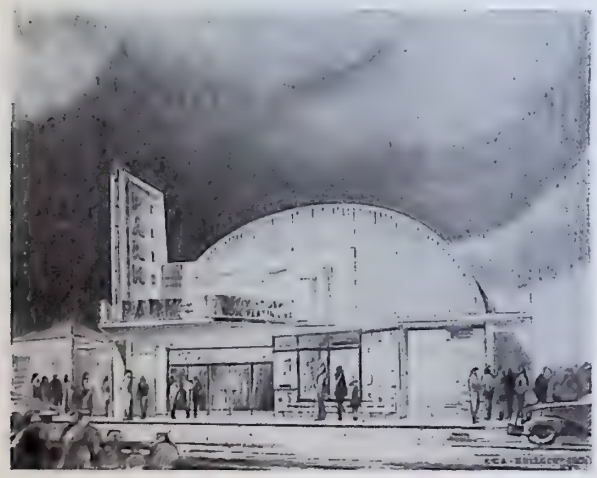
After considerable research and investigation of different types, we have come to the conclusion that the Quonset hut lends itself well to this special purpose.* First, because these units are already in full production for prompt delivery, and can be adapted very economically for a theatre with a maximum seating capacity of approximately 725 seats, and ranging downward to a minimum capacity of about 400 seats. Second, the standard 40-foot wide Quonset unit accommodates without waste space, a two-aisle seating plan with nineteen seats to the row.

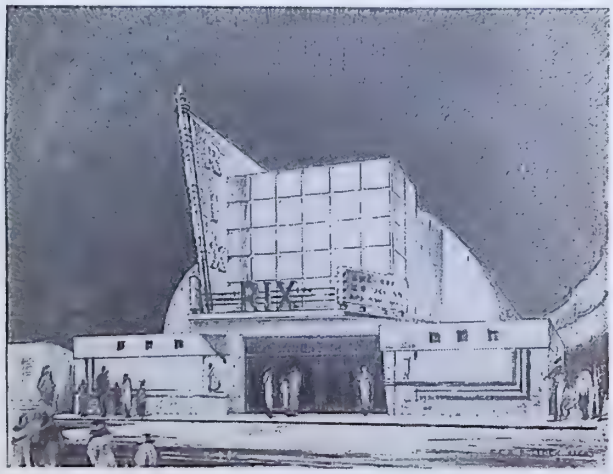
In addition to the above facts, the Quonset standard sections required to enclose the 725-seat theatre entirely can be completely erected, after the foundations are completed, in seven days or less, which reduces the cost and the overall elapsed time for the complete construction. With this advantage, it is estimated that the time required to complete and furnish a theatre of this type and 725 seating capacity should be about sixty working days.

The accompanying sketches show three basic schemes. Scheme "A" with toilets in the basement requires 7-2/5 standard 20-foot sections for 714 seats, seven standard sections for 657 seats, and six

*All plans and drawings used in this article are copyright, 1947, by E. C. A. Bullock, 119 West 57th Street, New York, New York.

The term "Quonset," as used in this article, refers to Stran-Steel's Quonset 40, Type B. For a full discussion of Stran Steel structural members in general and the Quonset in particular, with reference to theatre utilization, the reader is referred to the 1946-47 THEATRE CATALOG, pages 145-168. Besides construction data—and basic costs—six theatres utilizing Quonsets are presented in pictorial detail.





THE ENTRANCE FACADE adapts itself to many different and pleasing treatments, of which four "variations on a theme" are shown here. The treatment is limited only by the amount of money the prospective owner wishes to spend. The entire structure can be built of non-combustible materials, but it cannot be classed under most building codes as strictly "fire-proof construction," which requires structural steel to be encased in hollow tile or concrete. Interest in pre-fabricated theatres is due primarily to excessive costs of the design and construction of conventional theatres





standard sections for 505 seats.

Scheme "B" with toilets on the ground floor and with 10 feet of one story masonry construction at the entrance requires seven standard sections plus the 10 feet for 725 seats, six standard sections plus the 10 feet for 600 seats, and four standard sections plus the 10 feet for 475 seats.

Scheme "C" shows a 400 seat theatre which requires 5 standard Quonset sections.

The reduction in the seating capacity of Schemes "A" and "B" is accomplished by omitting from the center portion either one or two standard 20-foot sections. Further variations can be made by adding or subtracting from the Quonset sections in multiples of 4 feet which makes it possible to adapt this construction to any size property with a minimum width of approximately 51 feet 6 inches. The most economical unit by which either scheme can be varied in length is 8 feet. This will increase or decrease the seating capacity of either of the three schemes by exactly three rows or 57 seats.

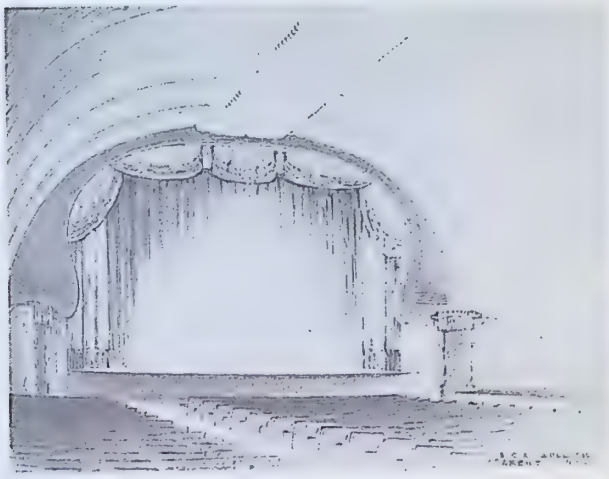
In either scheme the largest plan requires a lot 41½ by 150 feet, plus additional width as required for exit courts.

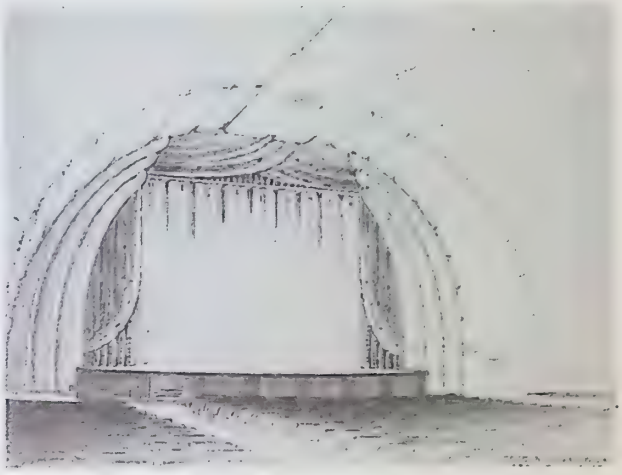
A modified stadium has been used in all plans which permits the greatest number of seats in any given length or number of sections, also utilizes the space below the stadium for the lobby, toilets, etc.

The stadium steppings have been designed of simple rolled steel sections entirely self-supporting and not attached to the Quonset construction. The steppings will have steel risers formed by the structural sections with concrete platforms.

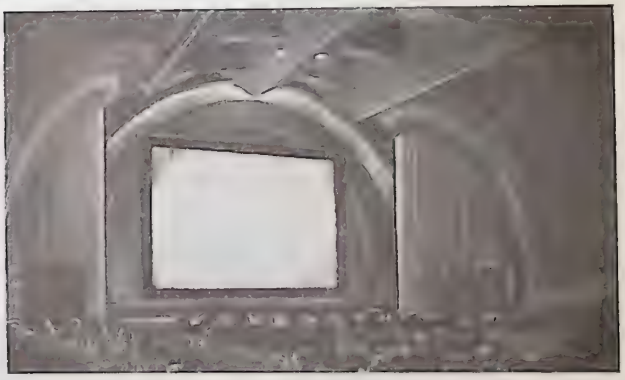
The entire structure can be built of incombustible materials but cannot be classed under most building codes as strictly "fire-proof construction," which requires the structural steel to be encased in hollow tile or concrete.

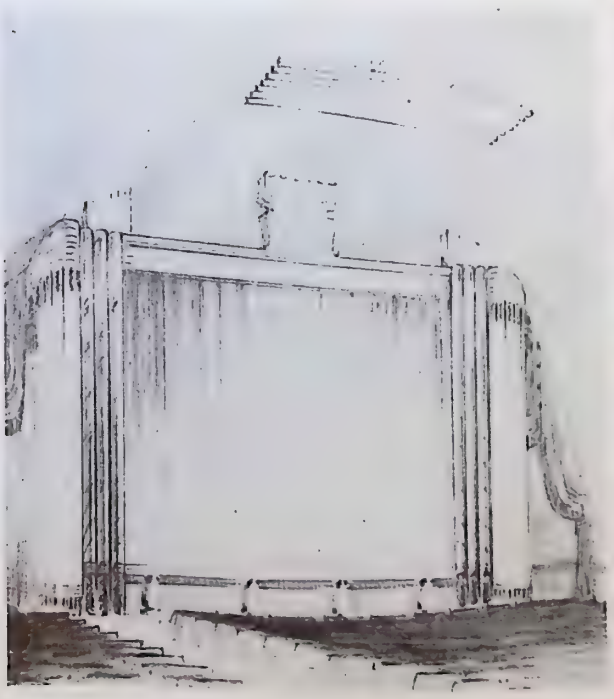
We have developed several methods



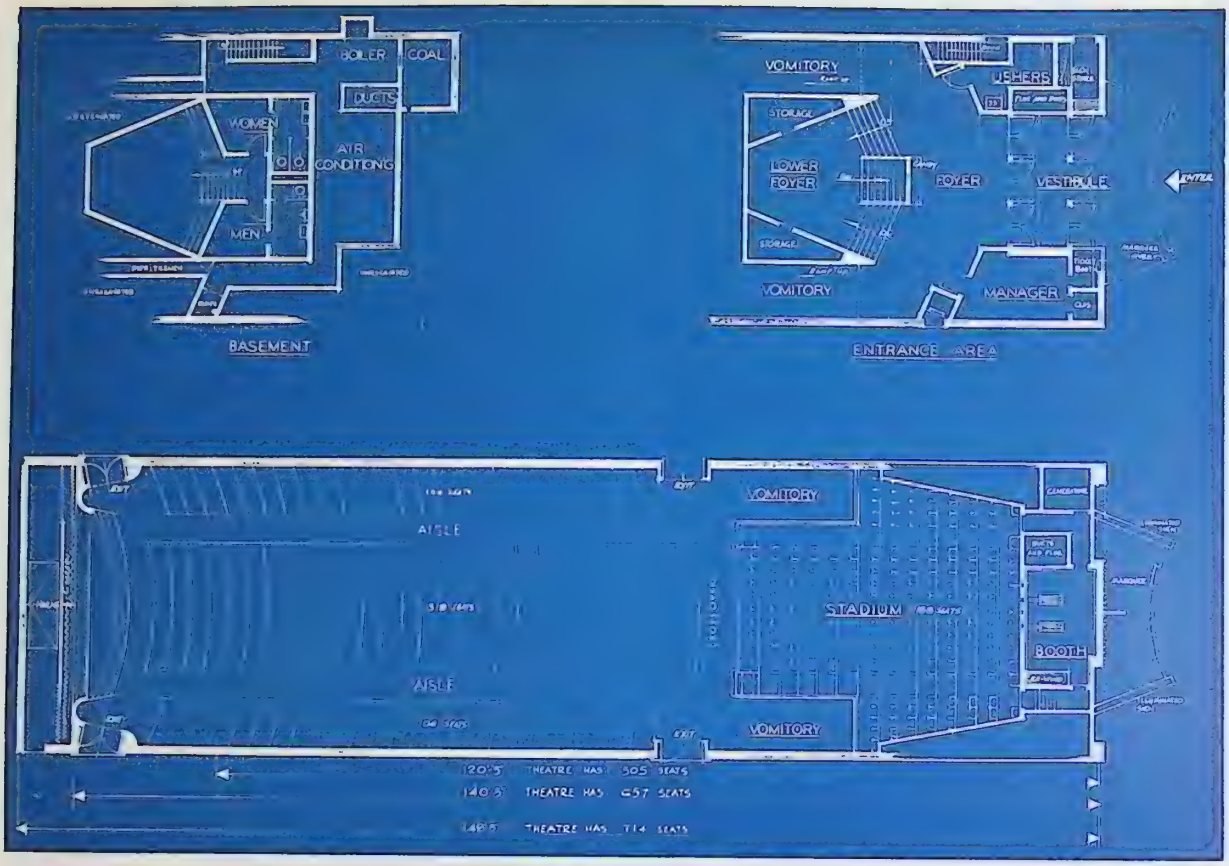


THE INTERIOR TREATMENT of the auditorium adapts itself also to many different and pleasing treatments, of which these five pictures are but suggestions. The treatment is limited only by the amount of money that the prospective owner will spend. A modified stadium has been used in each.









SCHEME A for a Quonset theatre, with toilets in the basement, requires 7 2/5 standard 20-foot sections for 714 seats, seven standard sections for 625 seats, and six standard sections for 505 seats. The reduction in capacity is accomplished by omitting from the center portion either one or two standard 20-foot sections. Further variations can be made by adding or subtracting from the Quonset sections in multiples of 4 feet, which makes it possible to adapt this construction to any size property with a minimum width of 51½ feet. The most economical expansion unit is 8 feet.

for applying thermal insulation to insulate the structure thoroughly against excessive heat loss in the winter, and heat gain in the summer season. Although the circular form of this construction creates some acoustical problems, an acoustical analysis has been made by competent authorities and the necessary corrections are possible without excessive cost. Laboratory tests of several materials are now being made for us and we hope to develop a treatment by which both the thermal insulation and the acoustical insulation can be accomplished in one operation. This will reduce the final cost to a considerable extent.

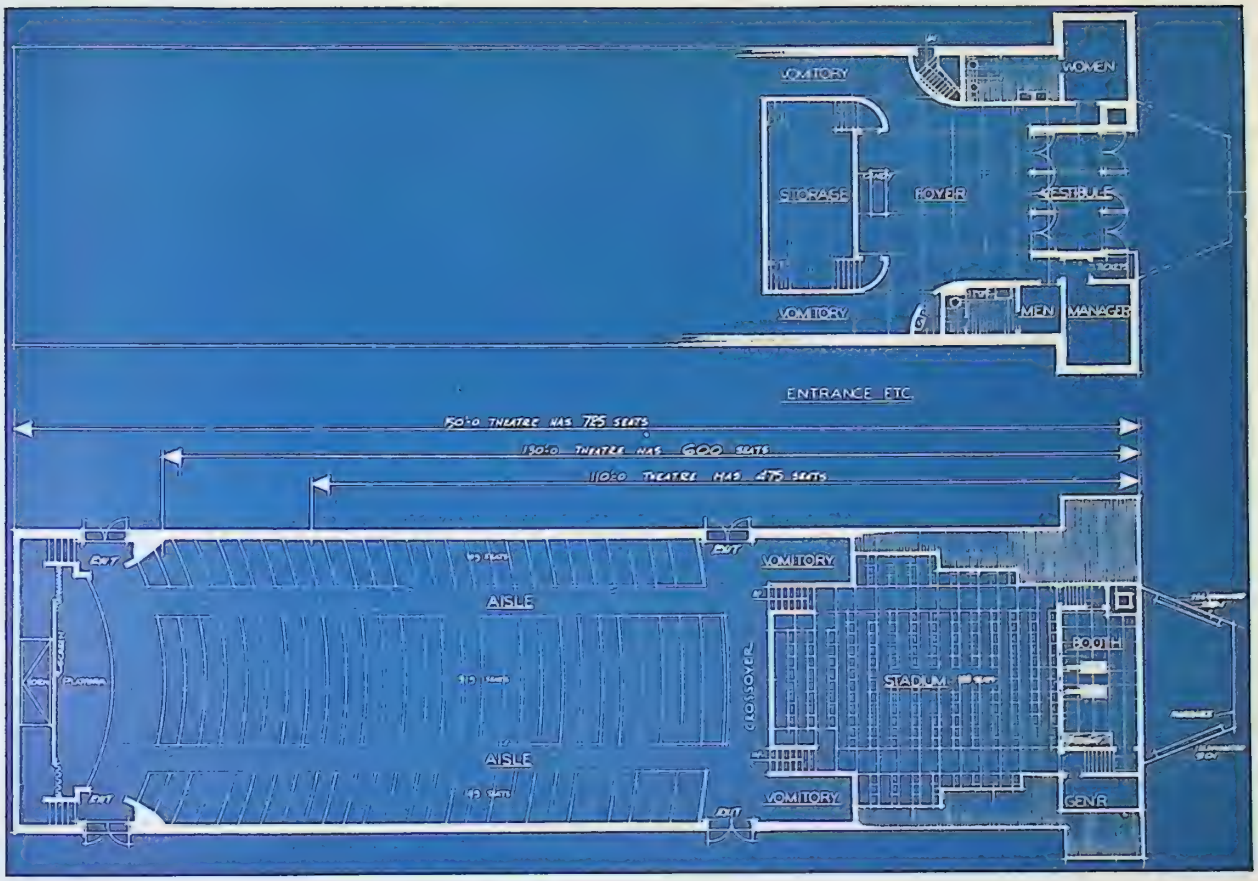
Complete working drawings for the larger theatre have been prepared and the construction costs have been carefully estimated by reliable contractors using prevailing union wage scales and material prices for the New York and the New Jersey areas. The figures given will therefore vary, downward in most other remote or rural areas, in accordance with the availability of local labor at lower wage scales. The cost will also be influenced by the treatment of the entrance, and the interior treatment and decorations, but we feel the costs as shown below will cover most situations and that they may be reduced in some localities.

As indicated by the accompanying sketches, the exterior entrance facade and the interior treatment of the auditorium adapt themselves to many different and pleasing treatments, limited only to the amount of money which the prospective owner wishes to spend.

From the accompanying figures (Table 1), it is evident that the 714-seat theatre of Scheme "A" or the 725-seat theatre of Scheme "B" can be built for approximately $72,400 (this figure includes the architect's fee), or $100 a seat without mechanical ventilation, refrigeration or equipment. If mechanical ventilation is required the additional total cost would be approximately $8,480, and to this

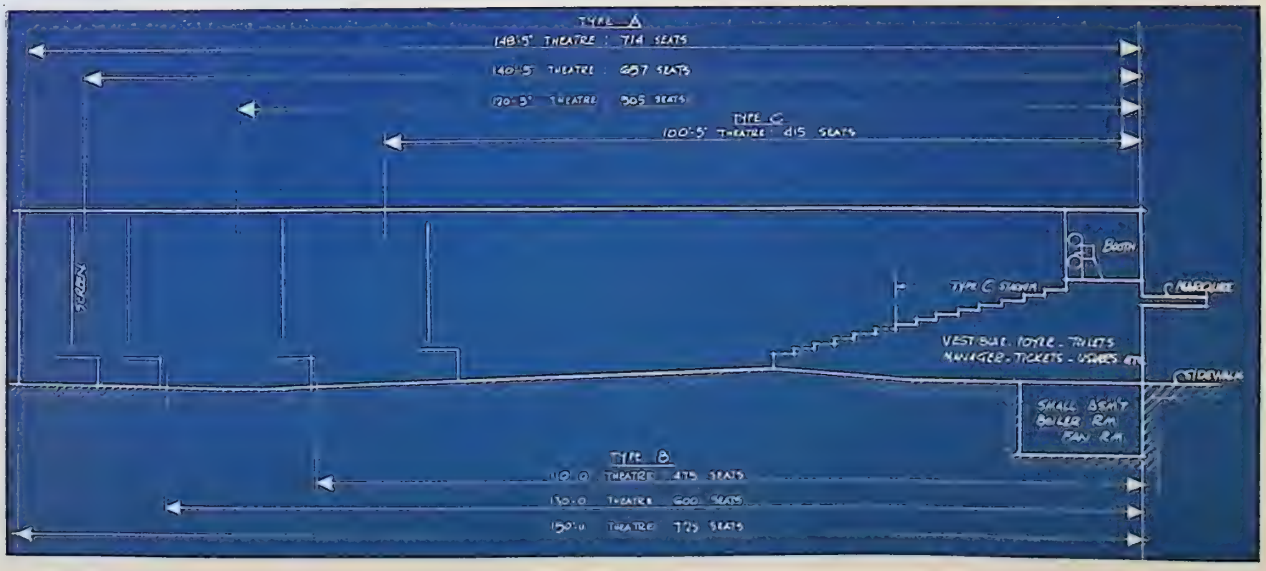
TABLE 1—Costs for construction and architect's fees, mechanical ventilation, and mechanical refrigeration for semi-prefabricated theatres of 415, 475, 600, 725 seats.

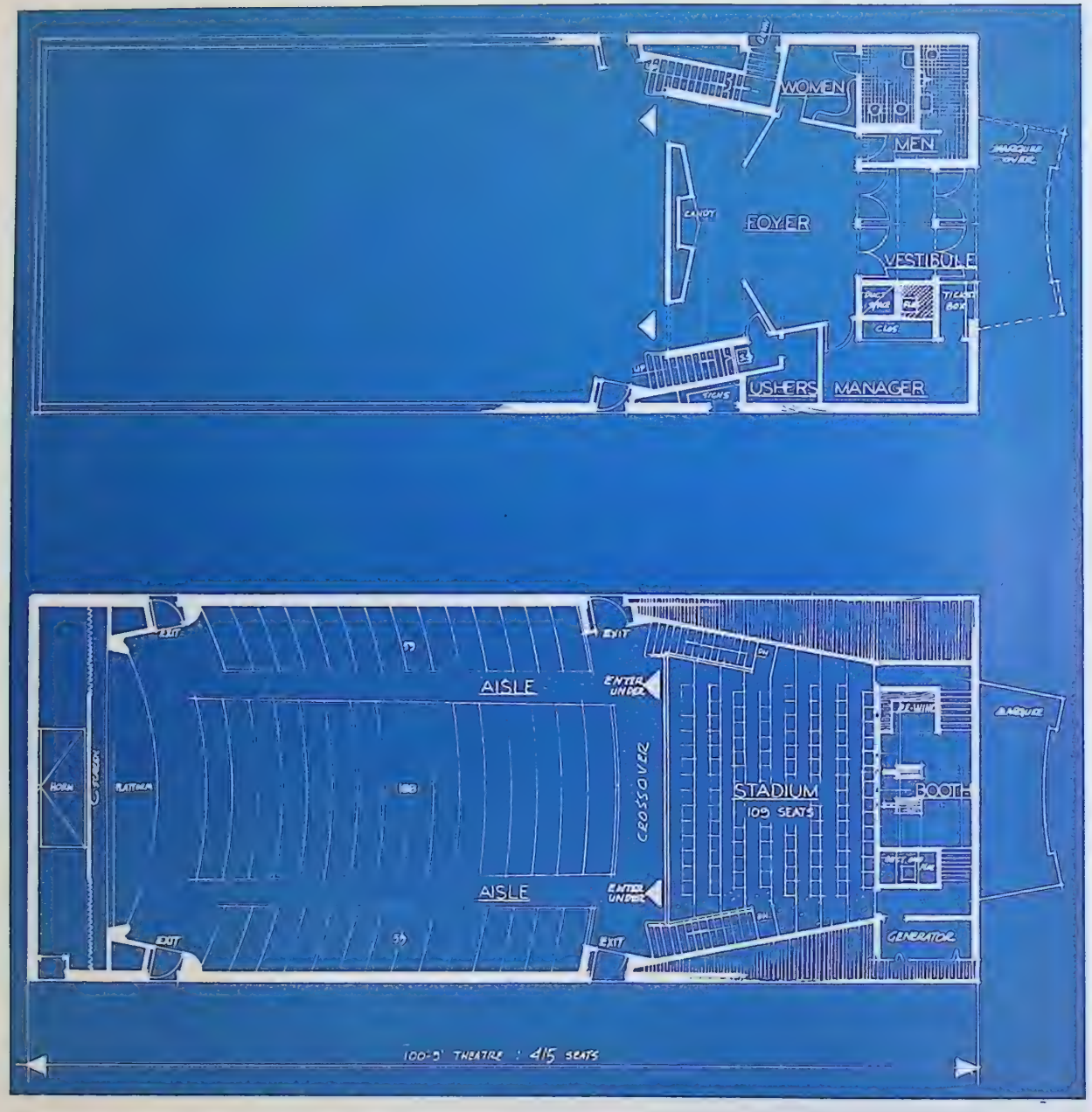
	725 Seats	Cost Per Seat	600 Seats	Cost Per Seat	475 Seats	Cost Per Seat	415 Seats	Cost Per Seat
Total Construction Including Architect's Fee	$72,400	$100	$68,700	$114.50	$61,200	$127	$58,530	$141
Add for Mechanical Ventilation	8,480		7,950		7,420		7,100	
	$80,800	$123	$76,650	$127	$68,620	$144	$65,630	$158
Equipment	25,000		23,500		21,500		20,500	
	$105,800	$146	$100,150	$168	$90,120	$190	$86,130	$208
Add for Mechanical Refrigeration	9,500		9,500		8,500		6,400	
Total, Including Mechanical Refrigeration and Equipment	$115,380	$160	$109,650	$182	$98,620	$210	$92,530	$223



SCHEME B for a Quonset theatre, with toilets on the ground floor and with 10 feet of one-story masonry construction at the entrance, requires seven standard Quonset sections plus 10 feet for 725 seats, six standard sections plus 10 feet for 600 seats, and four standard sections plus 10 feet for 475 seats. While further variations can be made, the most economical unit by which this scheme (as well as Scheme A) can be varied in length is 8 feet (two sections). In either scheme, the largest plan requires a lot 41½ by 150 feet, plus extra width for required exit courts.

THE LONGITUDINAL SECTION shows the critical lengths of the various schemes of the Quonset theatres. Scheme A requires 7 2/5 standard sections for 714 seats, seven for 657 seats, and six for 505 seats. Scheme B requires seven sections for 725 seats, six sections for 600 seats, and four for 475 seats, all with 10 feet more for the masonry front. Scheme C requires five standard sections for 400 seats. A modified stadium, used in all plans, permits the greater number of seats and makes room for lobbies, toilets, and the like in the space below the stadium.





SCHEME C for a Quonset theatre shows a 400-seat house, which requires five standard Quonset sections. However, the plan is not static, and may be increased or decreased after the manner of Schemes A and B. The most economical expansible unit is 8 feet, as this permits expansion or contraction by three even rows—or 57 seats—without having to consider the actual seating arrangement. The usual two-aisle seating plan has 19 seats. The 725-seat theatre can be erected, after the foundations are completed, in seven days or less, and 60 days for everything.

total should be added $9,500 if mechanical refrigeration is desired. Should the locality in which the theatre is to be located afford sufficient well water at a reasonable depth and below 60 degrees, the cost of mechanical refrigeration would be materially reduced.

The figures listed for the smaller theatres are estimated but we feel they are adequate.

The equipment figure of $25,000 for the larger theatre is based on the best available and includes carpets cut, sewn and laid over padding in the aisles, crossovers, lobby, vomitories, and ladies' room at $5.70 a yard, a padded back and box spring theatre chair upholstered in imitation leather at $11.50 installed, decorative painting, directional and exit signs, lighting fixtures, marquee signs, soffit, 350 changeable letters, and electric bulbs. Also included are house drapes, stage set, ladies' room furniture, office furniture, fire extinguishers, and so forth, lockers, projection booth equipment, including two complete projection and sound equipments and motor generator, ticket box, one two-unit ticket machine, coin change machine, ushers' and cashiers' uniforms, vacuum cleaner, safe, water cooler, and freight and hauling.

We feel that in many situations this budget can be materially reduced by omitting some items or substituting less costly equipment. However, to enable a fair comparison to be made we have included equipment which would be used in the best theatres. Some of the substitutions which would reduce the budget as shown are cheapter quality carpet, cheaper chairs, smaller marquee signs, rectifiers instead of motor generator, ticket machine, coin change machines, and the like.

The "Packaged" Semi-Prefabricated Theatre

Theatres Will Cost from $47 to $68 a Seat Using Quonset Arches, Factory-Built Units

BEN B. POBLOCKI
Poblocki and Sons

Ever since the THEATRE CATALOG (1945 edition, page 135) indicated the possibility of utilizing Quonset arches as the skeletal construction of theatre auditoriums, the idea has been growing, and already more than a score of cinemas have employed the arch-rib construction.

Most of the Quonset theatres have been designed and developed by individual architects, but, because of the very nature of their fabrication, the arch ribs and the method of their handling have become the heart of plans to develop a semi-prefabricated theatre which could be sold on a "package" deal.

One such plan, already available to prospective theatre owners, is that developed by Poblocki and Sons out of its 25 years' experience in the manufacture of marquees, signs, box offices, poster cases, and fronts for theatres.

THE PREFAB THEATRE

The theatre, for the time being called Prefab, is a permanent structure—not a temporary building or one just for resort areas—where nothing has been sacrificed in good construction, luxury, convenience, and functional utility. It is adaptable to any part of the country and to any locality, even for cold climates and rugged weather conditions.

Plans for the Prefab theatres—with seating capacities of 323, 423, 537, and 689, and of 494 and 822 for balcony theatres—were perfected after long research and development by the company, through the architectural firm of Peacock and Belongia, which has a nation-wide reputation for excellence in theatre design. Besides drawing on 25 years of experience, expert consultant engineers and advisory counsel were obtained from every branch of theatre construction, operation, and maintenance during the developmental stages of the plans and specifications.

In every detail the plans for each of the six sizes of theatres are complete, including (1) all structural and mechanical details, (2) seating and sight lines, (3) heating, (4) air-conditioning and cooling, (5) electrical wiring diagrams, (6) projection room layout, and (7) acoustics.

Thus, with complete plans, specifications, quantity lists and cost summaries, any good contractor can erect the theatre in about half the time required for the conventional type of construction. In actual construction, representatives of the Stran-Steel Division of the Great Lakes Steel Corporation can be of considerable assistance in handling the Quonset details of construction. These more than 500 representatives throughout the country can suggest contractors who are able to offer local prices for checking against Poblocki estimates.

The whole theatre is designed in accordance with the uniform building code (1946 edition) as prepared by the Pacific Coast Building Officials Conference. The most stringent requirements were met

FRONT OF THE PREFAB THEATRE shows the arrangement of the items pre-fabricated at the factory, including such items as canopy facia, name sign, poster case, attraction sign, box office, and porcelain front. The skeleton of the auditorium takes advantage of the many desirable qualities of the Quonset arch-rib construction. The "package deal" as set forth is for a permanent structure wherein nothing has been sacrificed in good construction, convenience, and functional utility. It is adaptable to any part of the country, even for the most rugged weather conditions possible.



TABLE 1—Minimum width and depth of lot for various Quonset theatres erected on an inside lot with an alley in the rear.

Seating Capacity	Minimum Width (feet)	Minimum Depth (feet)
323	44	85
423	44	105
537	44	120
689	50	145

NOTE: A side yard court at least 7 feet wide must be provided on one side for the 689-seat theatre.

in respect to the type of construction, exits, seating, fire safety, and related problems.

The floors, roof, and enclosing walls are constructed of concrete, steel and masonry. No wood is used, so the building is as fire-resistant as possible, and maintenance problems are at a minimum. The inside shape of the building, being set, of course, by the curvature of the Quonset 40 ribs, is perfect for sound, heating, air-conditioning, and ventilation, and it is clean, modern, and lends itself well to ideas in attractive decoration.

The costs listed are for the complete building and front, exclusive of equipment, such as chairs, drapes, curtains, rugs, booth equipment, and the like. But included in the over-all figures are costs for lot survey, excavating and concrete, mason work, structural steel and miscellaneous iron, carpentry, sheet metal work, roofing, lathing and plastering, painting and decorating, ceramic tile work, asphalt tile work, plumbing, heating and ventilating, electrical work and electrical fixtures, Stran-Steel units, erection of units, and glass and glazing.

Following is a summary of the items for the pre-fabricated theatre that are shipped from the Poblocki factory.

Canopy Facia — Constructed of 24-gauge polished stainless steel; 1 foot 2 inches high, 47 feet long. (Blueprint furnished with order.)

Name Sign — 24-inch cast aluminum letters; double outline of green fluorescent neon tubing installed on the face of each letter. Wired complete, with transformers. (In the event more than a five-letter sign is desired, the height of the letters must be reduced to 16 inches.)

Poster Case — 40 x 65-inch glass-size stainless steel case with 7/32 inch heavy sheet glass. Recess type, with porcelain front.

Attraction Sign, double face, three-line —4 feet, 3½ inches high, 9 feet, 4 inches long, wired complete. (Alternate for warm climates only: fluorescent neon tubing.) Two hundred fifty 9-inch Radiant cast aluminum letter font. Three-line stainless steel Hingedor frame with white opal glass for reception of above 9-inch letters. Sign body to be of 24-gauge steel, finished with Duco or equal enamel.

Box Office—4 feet 6 inches wide, 6 feet 6 inches deep, 7 feet 5 inches high. Exterior of box office faced with colored plastic panels. Interior insulated. Finished with plywood. Stainless steel moulding at top and bottom to hold glass in place. Deal plate and counter

TABLE 2—Minimum width and depth of lot for various Quonset theatres erected on an inside lot with no alley in the rear.

Seating Capacity	Minimum Width (feet)	Minimum Depth (feet)
323	55	91
423	55	111
537	57	127
689	57	152

NOTES: Where a court all around the theatre is required, it must be 6 feet wide for the two smaller theatres, and 7 feet wide for the two larger houses. Exit doors at rear may be moved to the sides and the rear yards omitted: lot depths will then be the same as for the building on an inside lot with alley in the rear (see Table 1).

TABLE 3—Minimum width and depth of lot for various Quonset theatres erected a corner lot, with no alley in the rear.

Seating Capacity	Minimum Width (feet)	Minimum Depth (feet)
323	44	91
423	44	111
537	44	127
689	44	152

NOTE: If court is provided at left side lot line, depth of lot may be the same as for a building on an inside lot with an alley in the rear.

covered with colored plastic. Recessed 1,000-watt electric heater.

Porcelain Front—Panels manufactured of 16-gauge porcelain enameled steel. Blueprints furnished with order.

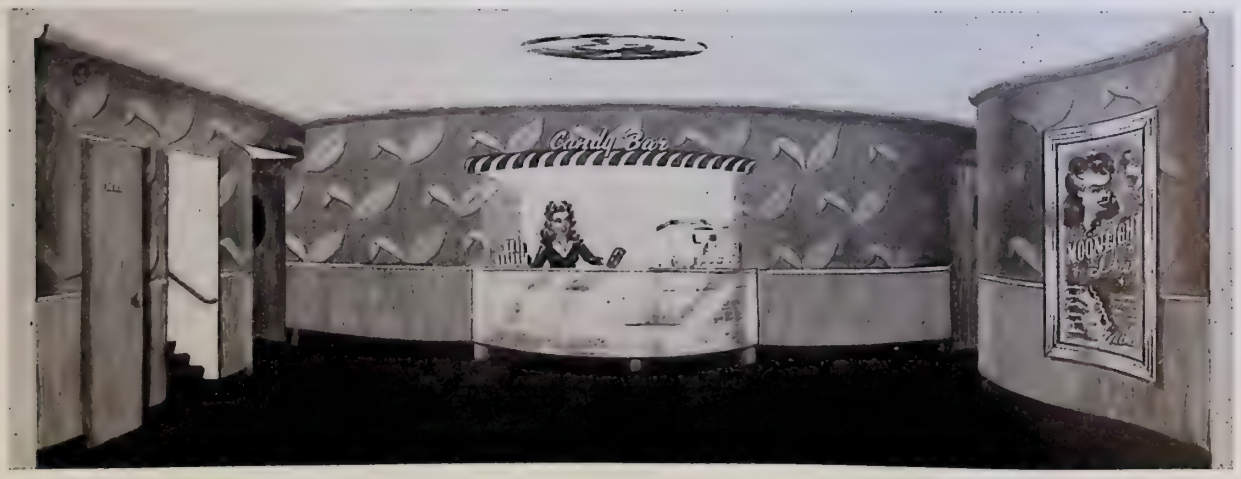
All materials are listed and the labor costs are itemized, including man-hours for each trade, so that it can be determined exactly what the theatre will cost.

If it is desired to omit some of the items, all that is necessary is to deduct the total cost of these rejected items from the total over-all cost.

Besides all the details of the theatre itself, the company has, through its architects, Peacock and Belongia, calculated minimum width and depths of lots to accommodate the theatres of the six sizes. Table 1 gives these data in the case of an inside lot with an alley in the rear. Table 2 gives the figures also for an inside lot but without an alley at the rear. And Table 3 gives the information for a corner lot, without a rear alley. Balcony houses seating 494 and 822 take lot sizes approximately the same as the 423- and 689-seat theatres, respectively, indicated in the Tables.

In order to accommodate more seats on the same lots that take the 423-, and 689-seat one-floor plans, the architect has drawn plans for theatres with balconies, accommodating 494 seats, including 90 in the balcony; and 822 seats,

LOBBY OF THE PREFAB THEATRE shows the placement of the concession stand in the area's most prominent space: directly in front of the incoming patron and between the entrance doors to the auditorium. The candy bar, as well as all the other parts of the theatre, has been designed in accordance with the uniform building code (1946 edition) as prepared by the Pacific Coast Building Officials' Conference. The most stringent requirements were met with respect to the type of construction, exits, fire safety, and related problems. Indicated theatre costs are exclusive of equipment.



including 148 in the balcony. These theatres with balconies are suggested as ideal for use in the South.

THE COSTS

Plans and specifications have been drawn up for 323-, 423-, 537-, and 689-seat theatres, for sale at the following prices. Included also are the cost figures for the four types of theatre.

	Cost of Plans	Cost of Building (Including Items for Front)
323-seat theatre (8 in cryroom)	$403.75	$26,161.00
423-seat theatre (25 in cryroom)	528.75	29,565.50
537-seat theatre (25 in cryroom)	653.75	34,101.00
689-seat theatre (25 in cryroom)	778.75	36,520.00
494-seat, balcony plan	630.00	32,887.96
822-seat, balcony plan	945.00	40,122.00

It will be noted from the estimated costs on pre-fabricated theatres in various capacities that the cost per seat is much higher on the 323-seat than the 689-seat theatre. As an illustration, the following is the cost computed on a per seat basis:

323-seat.....$68 per seat
423-seat.....$60 per seat
537-seat.....$56 per seat
689-seat.....$47 per seat

The cost per seat for the 689-seat house as indicated is very economical at the unheard of price of $47 per seat and, although the cost per seat for the 323-seat house of $68 seems to be high, by comparison with present-day building costs, this is also very small.

Naturally, the same identical projection booth, proscenium, stage, heating rooms and almost the same identical lobby are required for a theatre building whether it be 300 seats or 1,000 seats. The same holds good for equipment. Every theatre requires complete projection equipment regardless of size.

From the above, it can be readily seen that the larger the seating capacity the less cost per seat.

After studying these computed costs, it would seem that building a theatre of 323 seats would not be practical inasmuch as a 400- or 500-seat theatre can be built for a cost per seat which is much less than the smaller house. It is suggested that the seats be spaced 36 to 38 inches back-to-back instead of 32 inches; the trend is in that direction and the cost of the theatre is very little more.

In connection with these computed costs, every possible item has been included. It is possible to cut these costs considerably if the owner is willing to sacrifice some of the refinements.

Costs were based on an average cost of $1.85 an hour for all tradesmen. Poblocki and Sons has established dealers in every film territory in the United States and will establish dealers in Canada in the immediate future through whom plans can be purchased. Equipment costs can be procured from these dealers who are thus in a position to offer a turn-key job on the entire theatre at a definite cost.

FINANCING

In regard to financing, a 40 to 50 percent loan on a first mortgage plan can be obtained from an insurance broker in almost any location.

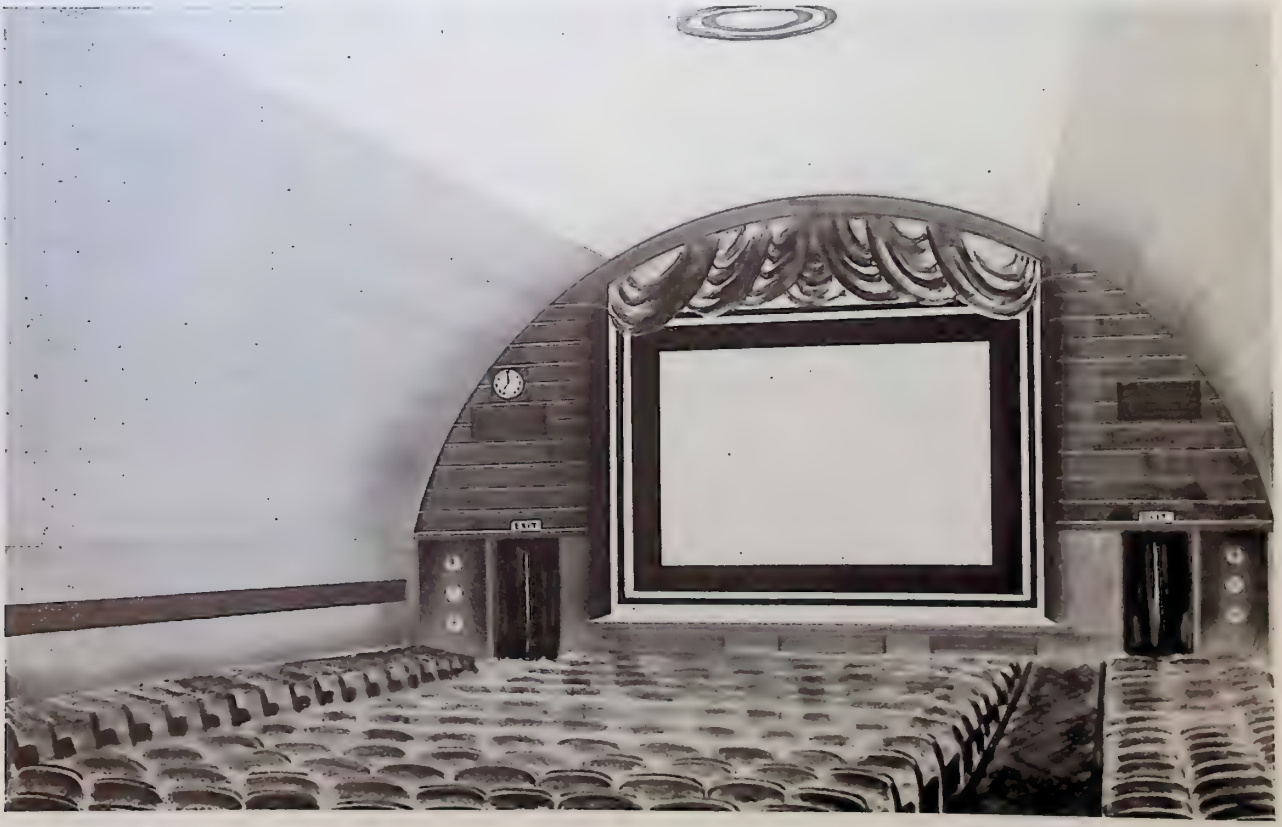
Northwest Mutual Life Insurance Company and the Connecticut Mutual Life Insurance Company have been advertising in Sunday newspapers for loans on one-purpose buildings, such as theatres and apartment buildings.

In the event the would-be theatre owner is a former serviceman, it would be possible for him to obtain a so-called GI loan.

If a loan cannot be obtained through established agencies, the Reconstruction Finance Corporation can be approached for a 40 percent loan on a first mortgage plan, covering a period of 10 years, with interest of approximately 4 percent on the unpaid balance.

The Company's dealers have information as to how finances can be obtained in their immediate territories and have CPA forms and so forth to be properly executed, facilitating this phase of the deal.

AUDITORIUM OF THE PREFAB THEATRE is as fire-resistant as possible, and maintenance problems are at a minimum. The inside shape of the building, being set, of course, by the curvature of the Quonset 40 ribs, is perfect for sound, heating, air-conditioning, and ventilation, and it is clean, modern, and lends itself well to ideas in attractive decoration. Plans and specifications have been prepared for theatres to seat 323, 423, 537, and 689 prsons, to sell, respectively, for about $26,000, $30,000, $34,000, and $37,000. These costs include the various items for the front of the theatre.



The Review of Recent Theatre Construction

The Picture Presentations of New Theatres And Notable Reconstruction and Remodeling









When publication of this annual reference work was resumed (1945 edition), it was deemed desirable not to publish a New Theatres section, but rather to devote the photolithogrophic portion of the book to architects' renderings of post-war planning. Among the many there represented, the eight, whose facades are re-presented on this page, have come into being and are shown in pictorial detail in the following pages: Madison, Covington, Kentucky, on page 114; Belmont (now the Dabel), Dayton, Ohio, on page 106; Covedale, Cincinnati, Ohio, on page 48; Esquire, Columbus, Ohio, on page 51; Saint Laurent (now the Normandie), Saint Laurent (Montreal), Quebec, on page 127; University, Columbus, Ohio, on page 124; May, Oklahoma City, Oklahoma, on page 116; and Strand, Wildwood, New Jersey, on page 81.

Theatres of the usual construction continue to be the main architectural interest, although the utilization of Quonset 40 in theatre design is fast becoming a potent factor for smaller theatres, as indicated in the three previous articles (pages 19, 24, and 28). Other types of low-cost construction seem not to have strongly developed during the past year.

Mention should be made of a newcomer to the low-cost construction field —the Alumi-Drome, an all-aluminum theatre of arch-rib construction, described in greater detail on pages 166 and 167.

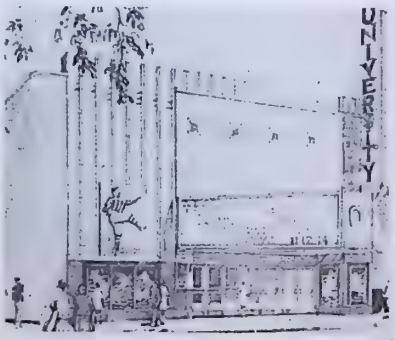
Since the end of the war, the number of drive-in theatres has steadily increased. This presentation, however, is devoted to theatres of the orthodox type, with the outdoor cinemas treated in a special Drive-In Section (page 179 and following), in which eight pages are devoted to five of the more recent projects. With drive-ins, as it has been with regular cinemas, the trend is toward the bigger and better, both in the size of the development and the magnificence of the facilities offered. To this end, the development of specialized items of equipment has played a major role.

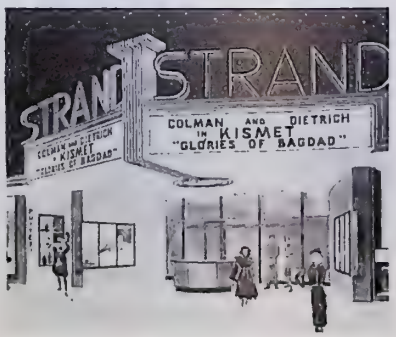
In the accompanying 96 pages of photolithography, 38 theatres are presented in pictorial detail, the material representing 29 of the newer theatres in 16 states and the Territory of Alaska and nine new theatres in five foreign countries. (For pictures of other U. S. theatres, with particular reference to signs and letters, the reader is referred to the article on page 212 and, for a similar consideration in reference to foreign cinemas, to page 225.)

The material here presented has been selected in such a way as will show what has been done in a wide variety of situations, from small country places to great urban centers, from a few hundred seats to a couple of thousand. Textual comment has been kept to a minimum, that the pictures may themselves be their own most eloquent commentary.









After Years of Travail, a New Theatre Opens in Anchorage, Alaska

The Fourth Avenue Theatre

Nothing is too good for Alaska. This is the oft-expressed opinion and sincere belief of Capt. A. E. Lathrop, who has played a major part in the development of this territorial outpost. The latest manifestation of his conviction was the opening on Memorial Day, 1947, of the Fourth Avenue Theatre in Anchorage.

This gesture of aflection, reputedly costing a million dollars, is the last word in luxurious appointments, with specially designed drapes, carpets and furniture, and murals all blended in a definite harmony of color and outline.

Probably no theatre has ever been built in the face of as many unforseen obstacles. Delays were frequent and vexatious what with postponements due to war conditions, restrictions on building materials, and problems of labor and transportation. But the work, begun more than five years earlier, was finally finished.

The theatre was designed by B. Marcus Priteca, with A. A. Porreca as associate architect. The murals are the work of Tony Heinsberger, of international distinction as an artist and decorator.

The equipment and furnishings—including draperies, carpets, seats, custom-built furniture, projection, sound, and various mechanical devices were all obtained through the B. F. Shearer Company.

In the auditorium are 985 special Heywood-Wakefield theatre chairs upholstered in turquoise blue mohair; the metal parts finished in rose beige to blend with the handsome walnut woodwork throughout the main part of the theatre. In order to stagger the seating on the main floor, Captain Lathrop purchased twenty-four 30-inch wide, specially constructed loveseats, upholstered to match the theatre chairs, and to be placed at the opposite ends of each row of chairs.

As the construction of the theatre progressed it became apparent that no factory-built furniture could be found that would do justice to the design and other appointments of this theatre of tomorrow. The Shearer company designer prepared sketches and models, using Plexiglas as his medium instead of wood, to reflect and thus not detract from the handsomely paneled walnut walls in the foyer and lounge area. From these designs were made three large tables with curved Plexiglas bases and gilt-grained birdseye maple tops and they were placed in front of three large mirrors in the circular mezzanine lounge. Three 8- and 10-foot benches were placed in foyer and mezzanine. The benches have sheets of fluted Plexiglas, curved in serpentine fashion to form their bases and they are upholstered in turquoise mohair to match the leaf design of the rug.

The ladies' powder room reveals an added touch of elegance. It has three elliptical-shaped powder stools with Plexiglas bases and upholstered in light tan plastic fabric. In the room are also three chairs upholstered in rose frieze to match the floral pattern of the rug. They are designed so that they may be used either as separate units in a grouping with the leather-upholstered round table, or pushed together to provide lounge or settee.

The same attention to detail and feeling for color harmony extends through every part of this extraordinarily magnificent theatre. Surely, nothing is too good for Alaska.

THE FOURTH AVENUE THEATRE was designed by B. Marcus Priteca, with A. A. Porreca as associate architect, for Capt. A. E. Lathrop. The facade is faced with Roman Travertine marble, with a three-story vertical name sign the dominant decorative element. The marquee, extending the width of the theatre, is little more than a shelf over the sidewalk to protect patrons in the event of inclement weather, since the structure carries no provision for using changeable letters. Because of delays due to war conditions, the theatre, costing about a million dollars, was some five years building.





THE MEZZANINE of the Fourth Avenue Theatre is set off by fluted wood paneling and mirrors. Above the stairway is a tessellated mural, showing, in each of the twenty squares, typical individuals in the flora and fauna of Alaska. The carpet was specially woven by A. and M. Karagheusian.



LOOKING DOWN STAIRS from the mezzanine, another view is obtained of the twenty-square tessellated mural above the stairs. The carpet was created by G. F. McGimsey, Karagheusian's chief designer, from suggestions made by Miriam Dickey. A pleasing flower and leaf pattern is used.



THE FOYER is illuminated from indirect lighting shells installed in sweeping curves. The paneling is of walnut, as also are the fluted columns. The semicircular staircase leads to the mezzanine waiting. No late-arriving patrons are seated during the screening of a subject: they must wait until the next show starts. There will be no double bills or extra-profits sales of candy, popcorn, and the like.

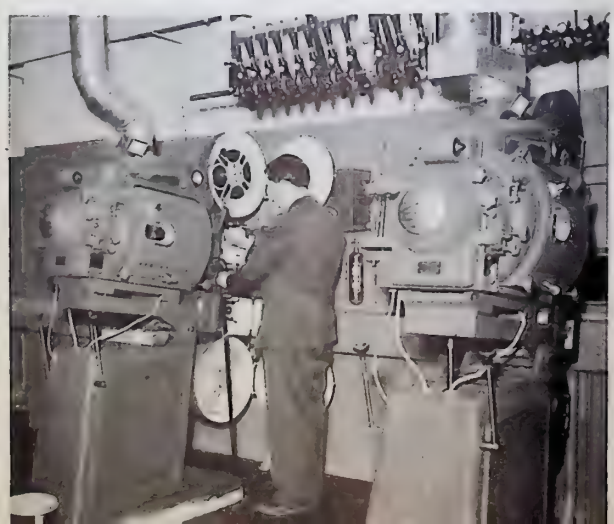


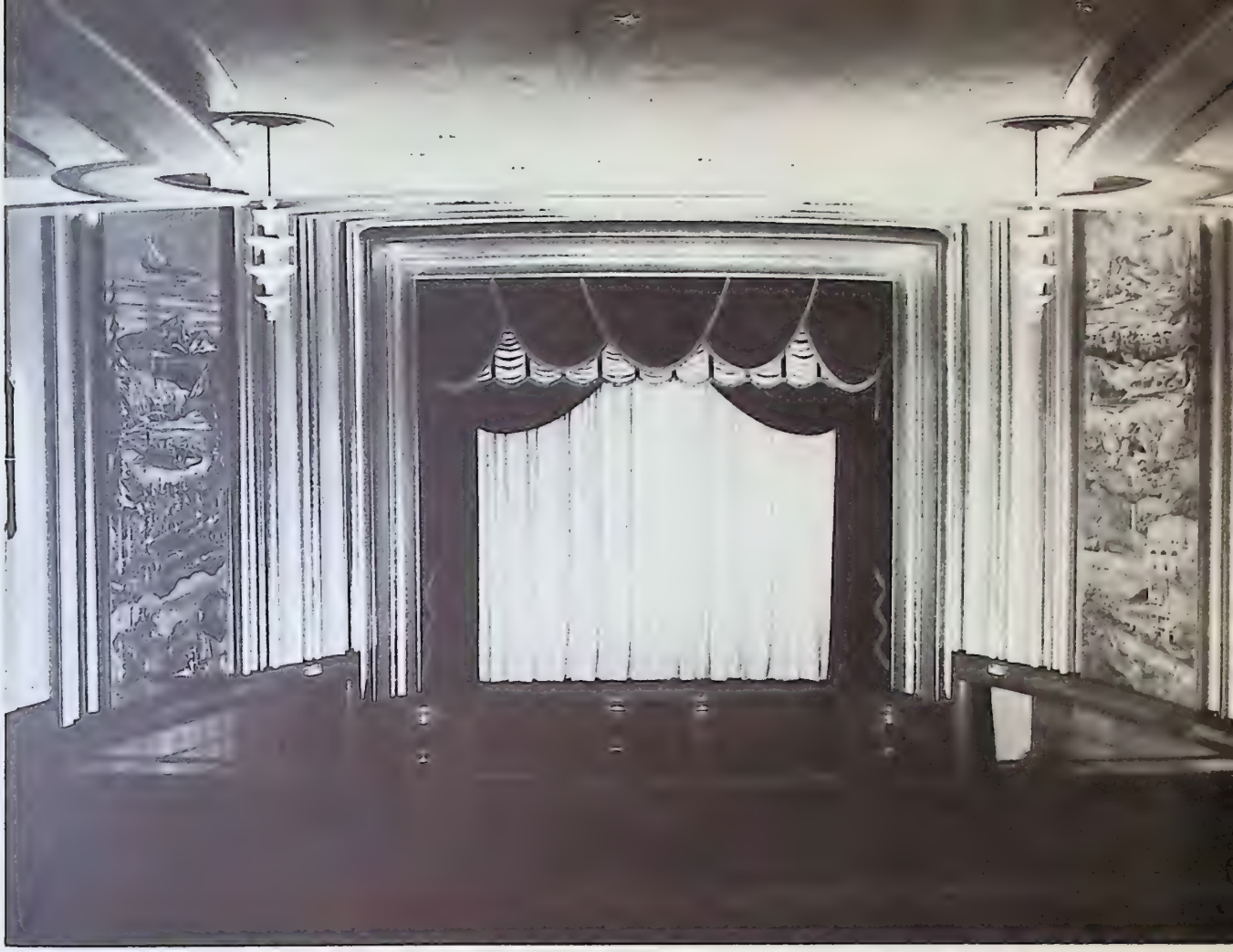
DOMINATING the foyer is a giant bas relief in gold and silver, depicting the rugged majesty of Mount McKinley, the work of Tony Heinsberger, one of the up-and-coming artists and decorators.

THE LADIES' POWDER ROOM reveals three elliptical powder stools with Plexiglas bases and upholstered in light tan plastic fabric. Other chairs, upholstered in rose frieze to match the floral pattern of the carpet, are designed so that they may be used as separate units or grouped together.



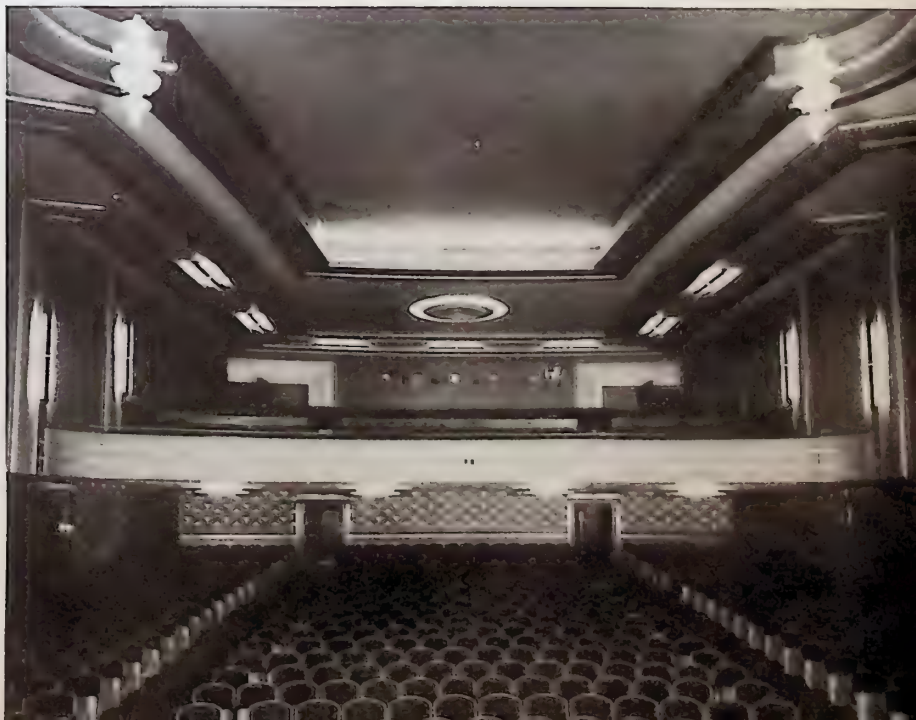
THE PROJECTION ROOM is equipped with Model AA Motiograph projectors, M911 Motiograph-Mirrophonic sound, Altec Voice of the Theatre speakers, Ashcraft Suprex lamps, Bausch and Lomb's f/2.0 coated Super Cinephor lenses. Other booth equipment includes other Golde and Neumade items.







THE AUDITORIUM is dominated by the proscenium and the 26-foot murals flanking it (above). The stage draperies consist of a deep festooned grand drapery, following the contour of the arch, in a rich cardinal velour trimmed with 6-inch gold bullion fringe. The main curtain is made of the same deep cardinal velour as the grand drapery, but instead of the usual barn-door method of operation, is designed as a butterfly type, opens in graceful festoons in harmony with the interior and architectural design. Behind this curtain is the title curtain of silver Ritzray satin, matching border in color and material. The borders and legs in harmonizing colors mask the stage. The ADC controls are operated from the booth. The murals (above and lower left), depicting salient elements of Alaska's geography, industry, and history, were done by Tony Heinsberger. In the auditorium (below) are 985 Heywood-Wakefield chairs upholstered in turquoise blue mohair. Patron comfort is accentuated.



FOYER
STAGE
SCREEN
VESTIBULE
LOBBY
BO
OFFICE
MEN
MEZZANINE
BALCONY
MEZZ.
LOUNGE
TOILET
POWDER
ROOM

Community Fitness Shown by an RKO Theatre near Trenton, N. J.

The Hamilton Theatre

The proper design of a cinema is always a tricky job; but, when the theatre is to become a prominent element of a community more residential than business, the task of the architect is considerably more exacting: he must not only design the theatre for the purpose of exhibiting motion pictures, but he must consider the "eternal fitness of things" and plan a structure which will blend physical attributes and the esthetic characteristics so that the theatre will, from the start, be wholeheartedly accepted by the potential patronage. It is not an easy task, but it is always worthwhile.

How well this suiting the theatre to the community can be accomplished is exemplified by the Hamilton Theatre, a link in the RKO Theatres' chain opened a little over a year ago, in Hamilton Township, New Jersey, near Trenton. Indeed, so important did William I. Hohauser, architect, consider this project that he himself designed the entire decorative pattern and color schemes.

Situated on the corner of Broad Street and Murdock Avenue, the Hamilton Theatre, a new suburban community-type cinema, features a Neo-Colonial architecture throughout and embodies all the elements that provide for perfect entertainment, safety, and comfort. Set back from the landscaped lawn, structure is constructed of reinforced steel and steel trusses, with a roof of steel and pre-cast concrete planks and walls of brick and cinder-block faced with red brick. The columns, doors, frames, and trim are of wood, white-enameled for glistening beauty. No marquee or sign-work adorn the front: merely the theatre name spread upon the entablature of the colonnade and two one-sheet frames flanking the portico denominate the establishment as a theatre, the centrally located box office notwithstanding.

Special dedicatory ceremonies marked the opening of the theatre, with one of the highlights being the dedication of a Memorial Tablet honoring the young men of Hamilton Township who served during World War II.

As the theatre opened, the estimated 10,000 in the area were offered their cinematic fare—some of it in double-feature programs—at 40 cents for adults, whether at an evening, Sunday, or Saturday matinee performance, and 25 cents for children.

THE HAMILTON THEATRE, in Hamilton Township, near Trenton, New Jersey, bears witness to the Princeton Playhouse influence and the tendency to design theatres for residential areas so that the cinema will not only serve its ultimate purpose of public entertainment but will, at the same time, reflect the spirit and temperament of the community. Thus, for this capital suburb, the architect has adopted a Neo-Colonial motif, in exterior design no less than in interior appointments. The columns, doors, and frames are of wood, finished in white enamel. Red brick is the facing.





THE LOBBY of the Hamilton Theatre (above, left) carries on the Colonial spirit initiated by the exterior. The walls are in purple, the ceiling in lemon yellow, the painting on finished plaster.



THE MEN'S LOUNGE (middle, right), with toilet facilities beyond, is even less sumptuous than the ladies' retiring room. Ease of maintenance was undoubtedly a consideration in the design.

THE OTHER SIDE of the lobby (above, right) is, of course, a mirror image. The lighting fixtures were specially designed for this theatre. Note also outlet grilles for the ventilation system.

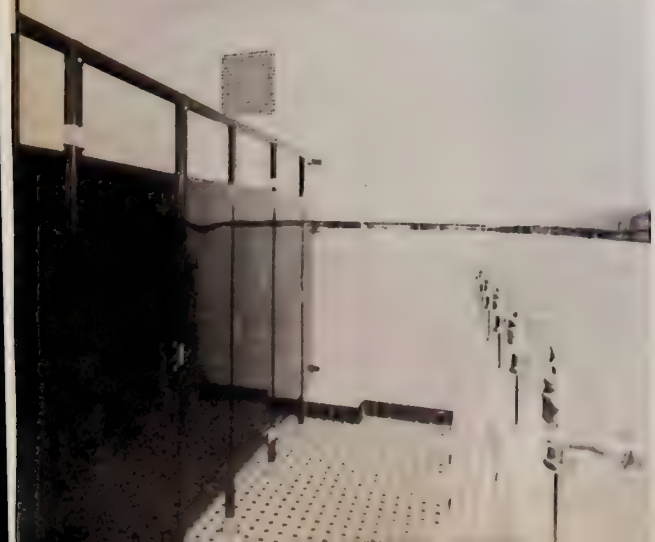


THE MEN'S TOILET (bottom, left), has a ceramic tile floor and walls of glazed tile tinted to a light green with black trimming. The stalls, partitions, and doors of the facilities are finished in black.



THE LADIES' LOUNGE (middle, left), with toilet facilities beyond, is designed in period utility, with a degree of elegance without the garish extravagance that can be sometimes encountered.

THE LADIES' TOILET (bottom, right), is finished similarly to the men's, but with a pinkish peach instead of green. The wall trimming is in black for decoration and convenience in maintenance.

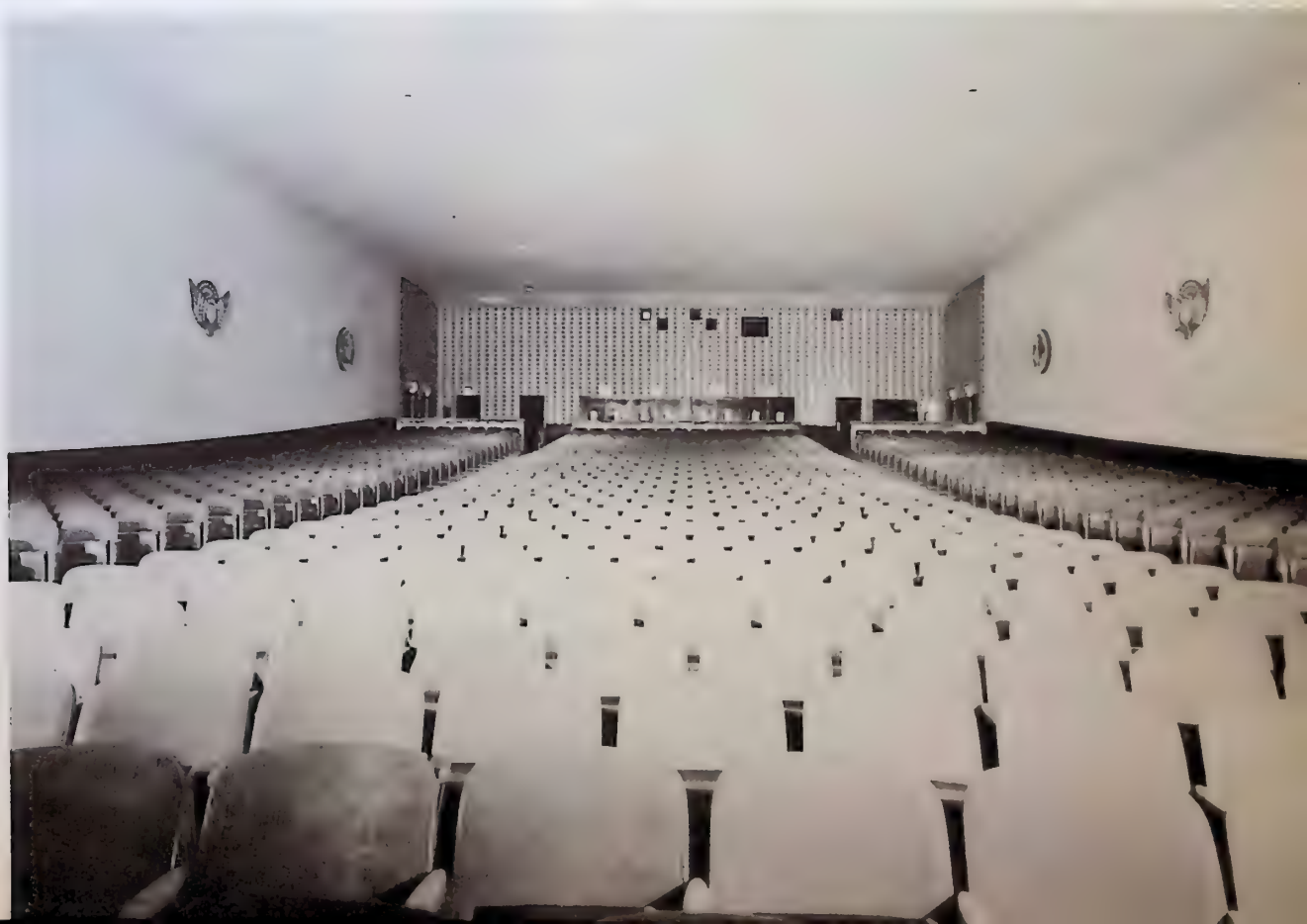


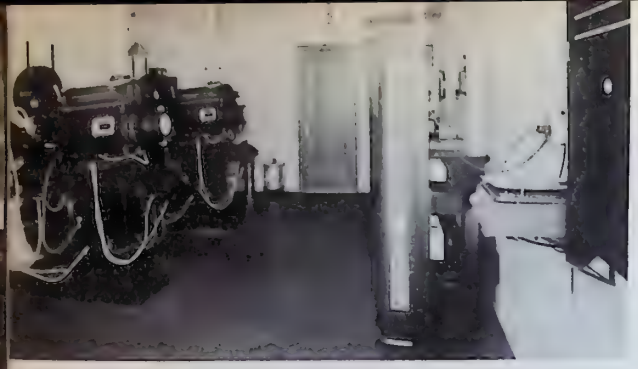




THE AUDITORIUM of the Hamilton Theatre is almost stark in its simplicity, but the color scheme of buff and blue, painted on side walls and ceiling of acoustical plaster, and the wainscot in dark red, make for pleasant surroundings. Three placques on each side wall comprise the other decoration.

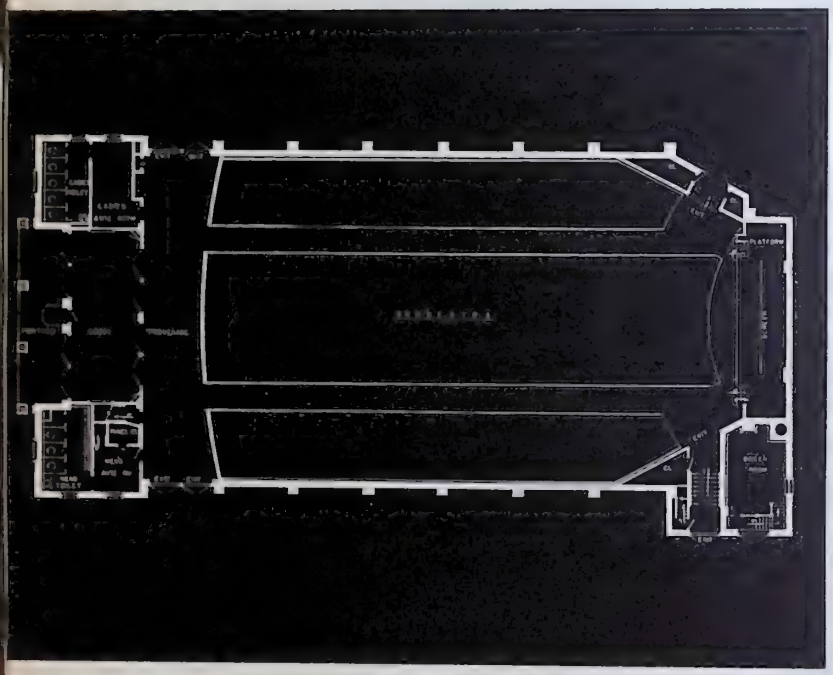
THE REAR WALL of the Hamilton's auditorium is of fabric in tones of red and tan, the material being applied over batts of rockwool. The standee space is provided with two sets of double emergency exit doors in each side wall as well as the four sets of double doors leading from the lobby.





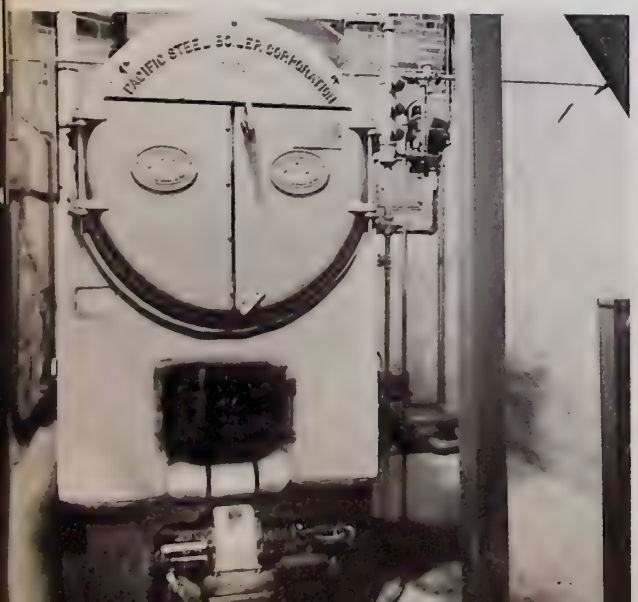


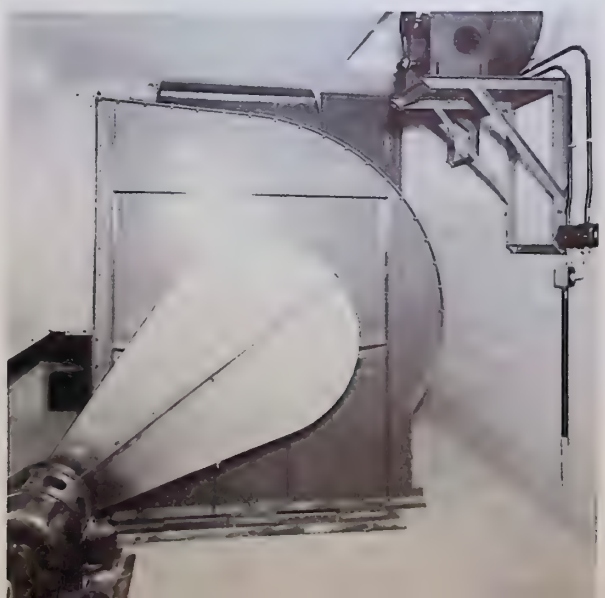
THE PROJECTION ROOM of the Hamilton Theatre (left) is spacious, allows for ample room around all the various items of equipment, including the amplifier racks and the record player. The rewind room (right), also with plenty of room in which to work, is equipped with both hand and automatic rewinders. As is generally recommended, this room is equipped with a port from which the screen may be watched.



THE PLAN of the auditorium shows the efficient layout of the theatre, with the ladies' anteroom and toilet off one side of the promenade and the men's anteroom and toilet off the other, and the portico and lobby of the theatre between them. The boiler room is located at the rear of the building in what is virtually a separate structure, with an entrance to it only from the outside.

THE HEATING AND VENTILATING SYSTEM involves an oil-fired boiler (left) and fans (right). At present the theatre is not equipped with air-conditioning, although very probably it could be installed quite easily at a later date. The boiler room, as will be noticed from the floor plan, is located at the back of the auditorium and at the right of the screen, but with entrance only from outside the building.





REFERENCE CREDITS

THE HAMILTON THEATRE
Hamilton Township, New Jersey

OWNER AND OPERATOR: Trenton-New Brunswick Theatre Company.
ARCHITECT: William I. Hohauser.
SEATING CAPACITY: 1,000, on one floor.
COST OF BUILDING: $150,000.
COST OF EQUIPMENT: $35,000.

GENERAL CONTRACTOR: H. D. Best McCaffrey Company.
HEATING AND VENTILATING: William F. Hindley.
PLUMBING: William F. Hindley.
ELECTRICAL WORK: F. J. Carr and Son.
LANDSCAPING: Ribsam Nurseries.

CARPETS: Crestwood, by Alexander Smith and Sons Carpet Company, through Greater New York Carpet House, Inc.
CHAIRS: Bodiform, by American Seating Company.
CHANGEOVERS: Thide, by Dowser Manufacturing Company.
CURTAIN CONTROLS AND TRACK: ADC, by Automatic Devices Company.
DIRECTIONAL SIGNS: by Charles J. Winston and Company, Inc.
FILM CABINETS: Neumade, by Neumade Products Corporation.
GENERATORS: Robin-Imperial, by J. E. Robin, Inc.
HEATING AND VENTILATING: Boiler, by Pacific Steel Boiler Corporation; Esso oil heater, for the Standard Oil Company (New Jersey); fan, by New York Blower Company.
LENSES: Super Cinephor, f/2.0, Balcote-surfaced, by Bausch and Lomb Optical Company.
LIGHTING FIXTURES: Downlighting, by Kliegl Brothers; special fixtures, by Charles J. Winston and Company, Inc.
PROJECTION LAMPS: Peerless Magnarc, by J. E. McAuley Manufacturing Company.
PROJECTION MACHINES: Super Simplex, by International Projector Corporation.
REWINDERS: Hand, by Neumade Products Corporation; automatic, by Goldberg Brothers.
RUBBER MATS: by Hamilton Rubber Company.
SCREEN: Hurley WS-15, by Hurley Screen Company.
SOUND: Photophone, PG 140-A, by Radio Corporation of America.
SUPPLY DEALERS: National Theatre Supply Division of National-Simplex-Bludworth, Inc., and Joe Hornstein, Inc.

Thanks to Quonset, Frankenmuth, Michigan, Has Its First Theatre

The Ken Theatre

That the utilization of the Quonset arch-rib construction is no handicap on architectural ingenuity and design has not been better exemplified than with the Ken Theatre, owned-operated by Albert Wakeman, in Frankenmuth, Michigan. While the theatre here pictured is complete, it is planned to add a number of stores, even with the entrance, which will tend to mask the Quonset from the road.

Frankenmuth, a German industrial community of some 1,200 souls, mostly Lutheran, has never had a theatre—even though the younger generation patronized the cinemas of nearby towns—and, had it not been for locating the project remote from churches and schools and using Quonset materials and Nuwood, the town might still be theatreless, for the CPA had turned down an application for a theatre of conventional cinder-block construction. At that, approval for a theatre structure not to exceed $10,000 was a year in coming, since Wakeman had had no theatre experience.

Wakeman reports that everything ultimately worked to his advantage: that the utilization of the Quonset and Nuwood have given him a theatre of excellent acoustic properties, without echoes or deadspots, and, by providing parking space, comfortable seats, excellent sound, hearing aids, and other items, along with a series of pictures hand-picked to the interests and tastes of the community, he has been given the wholehearted backing of the whole population.

Designed by I. A. Zakryzewski, the theatre, located on a lot 171 by 264 feet, will seat 496 in the Push-Back chairs of the Kroehler Manufacturing Company. The sign and marquee was constructed by Poblocki and Sons, with the changeable letters by the Adler Silhouette Letter Company. The lower part of the front is faced with maroon enameled Kolokrite trimmed with ivory and yellow. In the box office will be found a Coinometer Corporation coin changer and General Register Corporation's Automaticket registers. A Golde Manufacturing Company ticket chopper is used. The equipment was procured through the "Ernie" Forbes Theatre Supply.

As the theatre opened on September 19, 1947, on the outskirts of Frankenmuth, to serve an estimated population of 10,000 composed of farmers and industry workers, the policy was that of a first-run in the area with a top adult admission of 44 cents and 14 cents for children. In the first months of operation slapstick comedy seemed by far the type of picture best patronized.

THE KEN THEATRE, Frankenmuth, Michigan, eloquently proves that a cinema utilizing Quonset arch ribs for the auditorium framework need not be constructed all on one axis, from box office to the rear emergency exits. While the theatre portion of the development is completed, future plans call for the erection of stores, even with the theatre front, that will to a large extent mask off the obviousness of the Quonset construction. Other pictures in this series will show how well the architect adapted his design and materials to a not uncommon size and shape of property.







THE OUTER LOBBY (above and left) is spacious with the floor of finished concrete for the hard usage that it will receive. A popcorn machine (by the Star Manufacturing Company, Inc.) is conveniently installed in association with a smart candy counter. In the event of future increases in this aspect of operation, the lobby provides considerable possibility for expansion of the facilities. An intercommunication system is handily placed for convenience of the doorman.

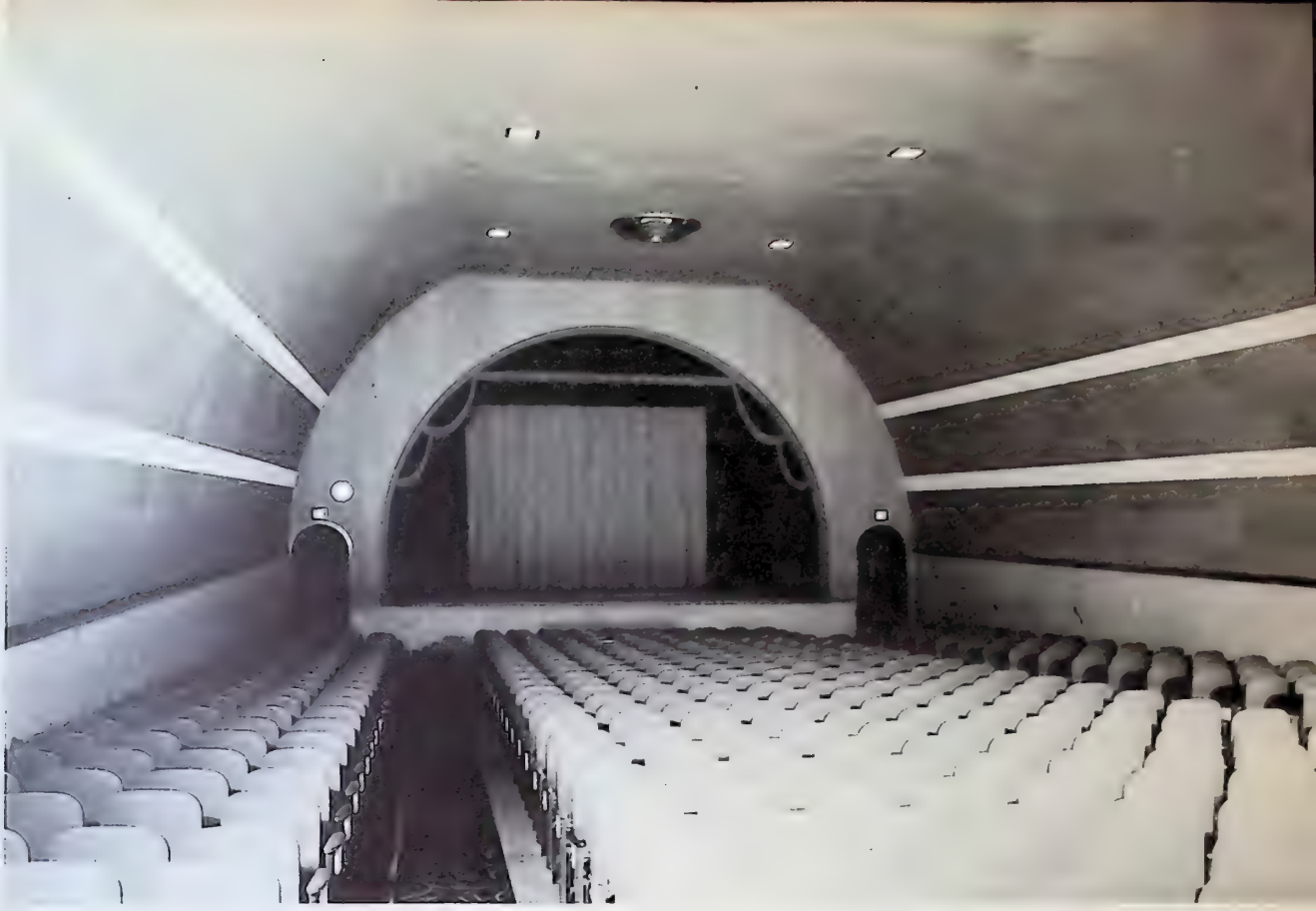
THE PROJECTION ROOM (not shown) is equipped with Brenkert projectors and Brenkert projection lamps, with rectifiers of the Baldor Electric Company. Projection lenses of the Kollmorgen Optical Corporation are used. The sound system is by the Radio Corporation of America. Other items include changeovers, manufactured for the Brenkert Light Projection Company; film cabinets, made by Neumade Products Corporation; and rewinders by the Golde Manufacturing Company.

THE THEATRE does not have an air-conditioning system, but the heating and ventilation plan includes a system of ducts which, in all probability, could be used if conditions should contrive to make summer-cooling desirable. Trane Company equipment has been used in the steam-heated, forced-air system, with circular ceiling and semi-circular wall air diffusers installed to insure the proper distribution of air tempered to the comfort of patrons throughout the theatre.

THE INNER LOBBY (right and left below) is carpeted, with cream and maroon the dominant colors. The walls and ceiling are faced with Nuwood tile, with light oak casings and moulding. At the far end of the area are the rest rooms, finished in Trimedge plastic tile in marbleized cream and maroon. Note the auditorium observation window at the doorman's station, and the way the glass is slanted to prevent any annoying reflections in the general seating area.







THE AUDITORIUM of the Ken Theatre is faced with Nuwood tile and planking throughout conforming to the curve of the Quonset arch ribs, with the exception that the top of the arch has been flattened to provide for running the ventilation ducts out of sight. Two lines of Stawhite tile along each wall sets off the simplicity of decoration. The draperies and stage curtains are by the Mork Green Studios and operated on track and curtain controls of Automatic Devices Company. Screen is by RCA. The carpeting throughout the theatre was woven by Mohawk Carpet Mills, Inc.







THE KEN THEATRE, as has been pointed out, is the first theatre—at least, one of the first theatres—to utilize Quonset arch ribs on a lot whose major axis is parallel to the highway, a circumstance not infrequently encountered. As pointed out in the last (1946-47) edition of this reference work, utilization of the Quonset in no way imposed any restrictions on the ingenuity of the architect, but rather that this type of construction was only one method of lowering construction costs. Indeed, since the Quonset arch ribs per se are never seen, any more than is the more orthodox structural steel, it is apparent that the same general principles of construction and decoration and treatment hold in both cases. Accordingly, a Quonset theatre can be expensive, but such a theatre can be very nice and very reasonable, such as this one, a 496-seat theatre built and equipped for about $27,000. The Ken Theatre was started on June 25 and opened to the public on September 19, 1947, two days over twelve weeks. On this page are shown three pictures of the theatre, the top and bottom pictures showing each side of the Quonset section of the cinema and the middle photograph revealing the construction of the front just before the final touches were effected. The pictures show the manner in which cement blocks were used to make the end walls and also indicate how the boiler room was constructed back of the screen area but still under the Quonset portion of the construction. The pictures of the Ken Theatre, taken in conjunction with photographs of other recent Quonset theatres to be found on pages 19 through 23, show what can be done to provide the less populous areas with modern theatres and at a first cost which makes the venture economically feasible. But the wise theatre owner, tyro or old timer, will always employ the services of a qualified architect as well as rely on the engineering facilities of the Stran-Steel Division of the Great Lakes Steel Corporation. The rules applicable to all construction are equally in force here.



Lust Opens a Theatre in Cheverly, Maryland, a Suburb of Washington

The Cheverly Theatre

On Defense Highway, in Cheverly, Maryland, just beyond the co-extensive City of Washington and District of Columbia, Sidney B. Lust opened his tenth theatre early last year, with David Ginsberg, widely known as "Uncle Dave," the house's first manager.

The new Cheverly Theatre was designed by the New York firm of John and Drew Eberson, architects, and built by Washington's Garfield I. Kass, who has been in on many theatres in the Capital.

The front of the Cheverly reflects the Washington influence, where facades are traditionally simple in keeping with the aspects of the monumental government buildings. However, the extensive marquee sign—with the silhouette letters in two colors—is the feature that dominates the theatre not of the Capital, where such signwork is verboten.

The lobby features imported marble from floor to ceiling. The foyer at the rear of the auditorium has a ladies' powder room and a men's smoking room.

In the auditorium, the effect of unusual height is given by the use of fluted vertical columns, while the wide proscenium arch tends to eliminate the bad sight lines occasionally encountered on the sides down front. The tiers of seats, comprising 944 Bodiform chairs, are set 36 inches back to back to permit plenty of leg room and passing space.

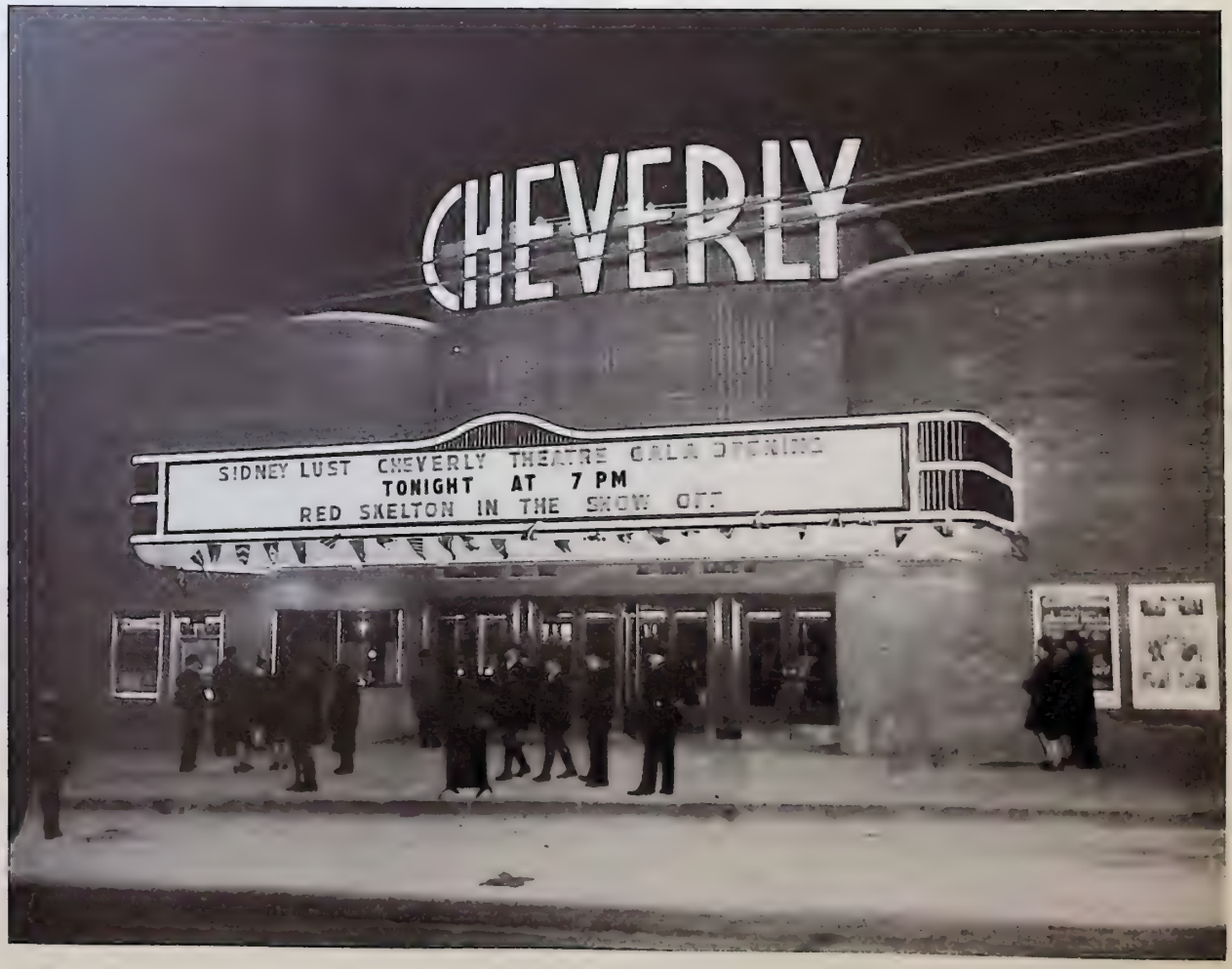
Fluorescent paint, activated by black light, is used in the proscenium mural panels. Under the influence of the ultra-violet light, the pigments glow in the dark. Signs of the zodiac are represented in the center mural.

The newest type of projection and sound equipment provides top facilities for the scientific projection of both pictures and sound.

Modern air-conditioning equipment puts a very important emphasis on proper ventilation in the entire theatre.

The theatres under direction of Sidney Lust now comprise two in the District of Columbia, eight (including one drive-in) in Maryland, and one in Virginia, comprising one of the leading circuits operating out of the National Capital.

THE CHEVERLY THEATRE, the tenth link in the chain operated by Washington's Sidney B. Lust, is in Cheverly, Maryland, just over the line from the District of Columbia. (The eleventh, a drive-in, opened later: see pages 194 and 195.) The plainness of the facade is similar to that generally employed in the Capital's theatres, while the long marquee, with its silhouette letters, is alien, since the District's regulations ban this type of billing. Note that the box office is at the entrance's left, necessitating entering patrons to cross, generally speaking, the line of out-coming traffic.





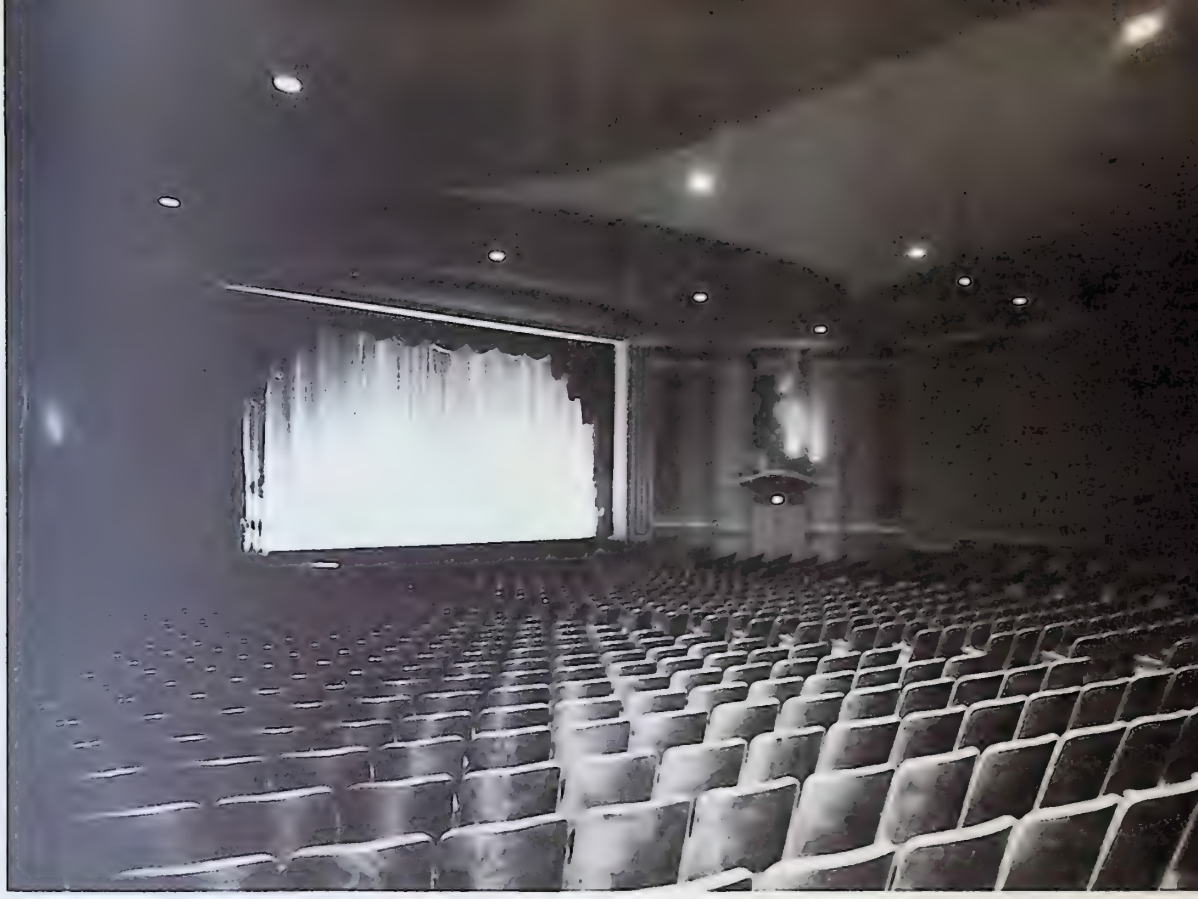
THE OUTER LOBBY of the Cheverly Theatre has its walls faced with imported marble, applied from floor to ceiling. The tesselated floor, designed in small units of different colors, is so arranged as to suggest directional lines as well as to offer the requisite decoration for the area. Considerable wall space is devoted to display space, using stills and other material, as might be procured from the National Screen Service Corporation, for the next three coming attractions. The space over the entrance doors is also used to announce coming pictures to patrons.





THE LOUNGES AND TOILET ROOMS are shown here. The ladies' suite (middle left and below) is comfortably equipped with modern furniture, pictures and mirrors. Carpeting is the same as is used elsewhere. The men's lounge (middle right) is also equipped with modern furniture, but the floor is not carpeted but covered with a material less amenable to damage from carelessly dropped cigarette butts. Entrance to the men's and ladies' lounges is from the rear of the standee area, the men's on right of the main entrance and the ladies' on left, each with its own sign.





THE AUDITORIUM of the Cheverly Theatre (above) seems to have taken advantage of width rather than to go in for the long and relatively narrow style, in order to accommodate the 944 Bodiform chairs from the American Seating Company. A spacing of 36 inches is here employed.

THE STANDEE AREA in the theatre (below) is completely carpeted, ex
for a short distance immediately on the auditorium side of the entra
doors, which area is covered with the same material as the lobby pro
A line of crowd-control posts and ropes can be set up in very short or



A House in Burgundy, Blue, and Yellow Adorns Cincinnati's Price Hill

The Covedale Theatre

In the heart of Cincinnati's Price Hill district stands one of the most luxurious theatres in the Midwest, the Covedale, designed by F and Y Building Service.

The entire front design is a harmonious combination of buff-colored face brick, local limestone, and multi-colored terra cotta tower, approximately 20 feet in circumference, on top of which is surmounted a series of horizontal flutings. Around the front of the ellipse is mounted an ornamental vertical sign, spelling out the name "Covedale" in channel letters highlighted by colored neon, facing in two directions. On top of the horizontal fluted ornamentation is a huge lantern of bronze and glass, topped by a metal spire, extending approximately 62 feet from the grade.

On the left half of the front elevation, a formal multi-colored terra cotta garden wall has been erected in front of an ivory ornamental panel, rising to the roof, which accentuates that portion of the front elevation.

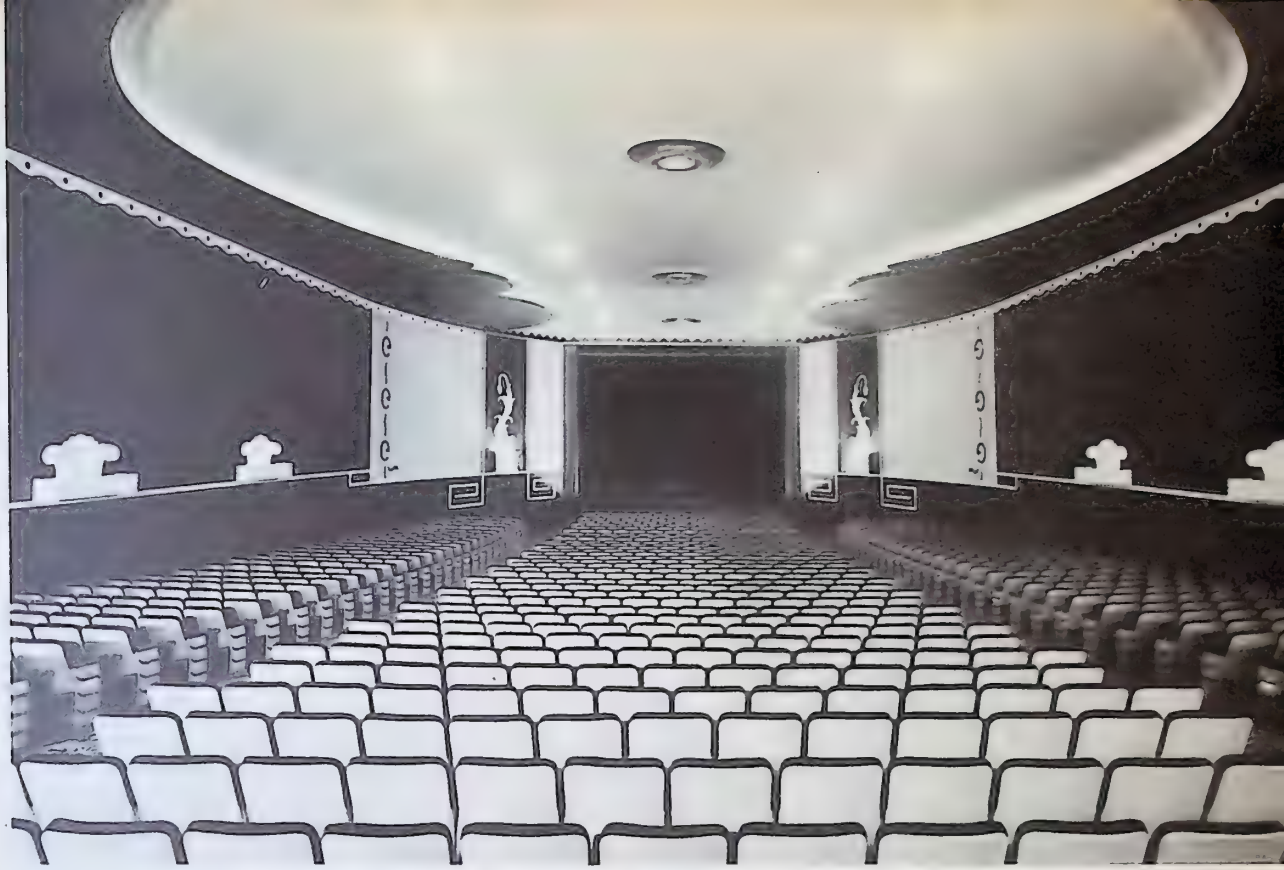
A semi-circular box office, centered in the entrance area, is flanked on either side by three huge solid glass doors, trimmed with stainless steel. Entering into the first foyer are six additional glass doors, which afford partial visibility of this area from the street. The foyer is kidney-shaped and decorated in various shades of blue and bright canary yellow.

A completely equipped concession counter, decorated in rich tufted leatherette, serves both the first lobby and the foyer. There is plenty of display space for the various items offered for sale, as well as ample storage space under the counter and in the rooms to the rear of the concession area.

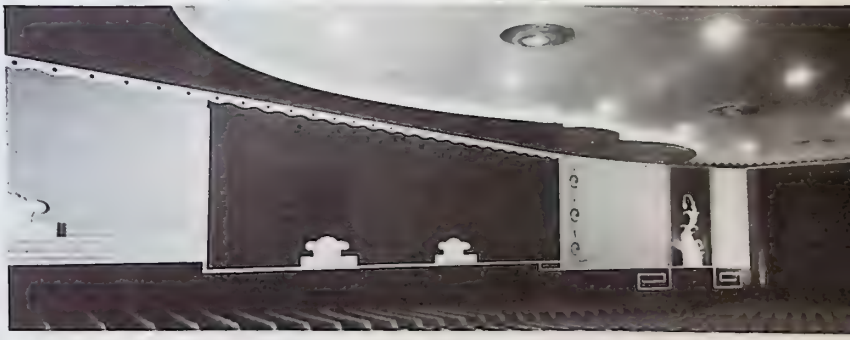
Rest rooms are to the left and right of the foyer. The women's powder room is featured in peach, with daylight blue neon lighting. A full mirror powder table and structural glass shelf extend the length of one wall. The peach tile toilet room has a terrazzo floor and Alabama marble toilet partitions. The men's rest room is completed in apple green tile, Alabama white marble, and a terrazzo floor.

THE COVEDALE THEATRE has a sign and marquee erected by American Sign, with letters by Wagner Sign Service. The terra cotta front is by Federal Seaboard Terra Cotta. Sidewalk radiant heating was installed by B. and J. Jacobs. Display frames were designed by the F and Y Building Service, which designed the theatre. Glass Doors are Fulvue, by Libby-Owens-Ford. In the box office are Automaticket machines by General Register and coin machines by Brandt. The ticket box railing and rope are from Reliance Art Metal. Three materials are used in the facing.





THE AUDITORIUM has International Chairs. Carpeting is by Leedom, with carpet padding by Allen Industries. The theatre's air-conditioning system includes cooling compressors by General Refrigeration, heating and cooling coils by McQuay, evaporative condenser by Marlo, gas-fired boiler by Mueller, ventillating fans and blowers by Bishop and Babcock, and electric motors by Allis-Chalmers. The curtain controls and track are by Vallen, Inc. The general color scheme of the auditorium is burgundy and blue, accentuated by plaster baroque ornaments. The checkered fabric at the rear is made of spun glass.





For the convenience of the nine brothers and sisters of the Ackerman family, that owns the theatre, a 10-by-15-foot luxurious lounge, with a huge plate glass window facing the theatre's auditorium, allows the owners and their families to view the movies in complete privacy.

Entering into the specious auditorium from the standee space, one immediately notes the novel design developed by the use of a pale coral recess in the dropped ceiling. Burgundy spun glass covers the side walls. Lighting this field are three cast lighting plaster troughs, with French baroque cast plaster ornaments in alabaster white, concealing the source. Forward from the burgundy field, about three-quarters of the length of the auditorium, the curved plaster surfaces running toward the proscenium are painted a pale blue, which continue on each side to the proscenium.

At the rear of the auditorium, from a point approximately 20 feet from the projection room wall, a darker blue checkered spun glass fabric has been accentuated by wood molds in oyster white. Around the entire angle of an auditorium, formed by the ceiling and side walls, an escalloped white frieze is featured with red discs.

A sweeping curtain of burgundy crushed plush and rose and blue seats complete the over-all decorative effect.



THE FOYER is separated from the lobby by six glass doors (Libby-Owens-Ford's Fulvue), affording a view of the area from the street. The candy cases are through Berlo Vending. Furniture is by Shillito. Directional signs are by the Voigt Company. The drinking fountains are by Standard.



THE PROJECTION ROOM (not shown) is equipped with projectors and projection lamps by Brenkert; sound equipment by Radio Corporation of America; generator by Robbin-Imperial; rewind tables, hand rewind; cabinets by Neumade; enclosed rewind by Goldberg; and splicer by Griswold.

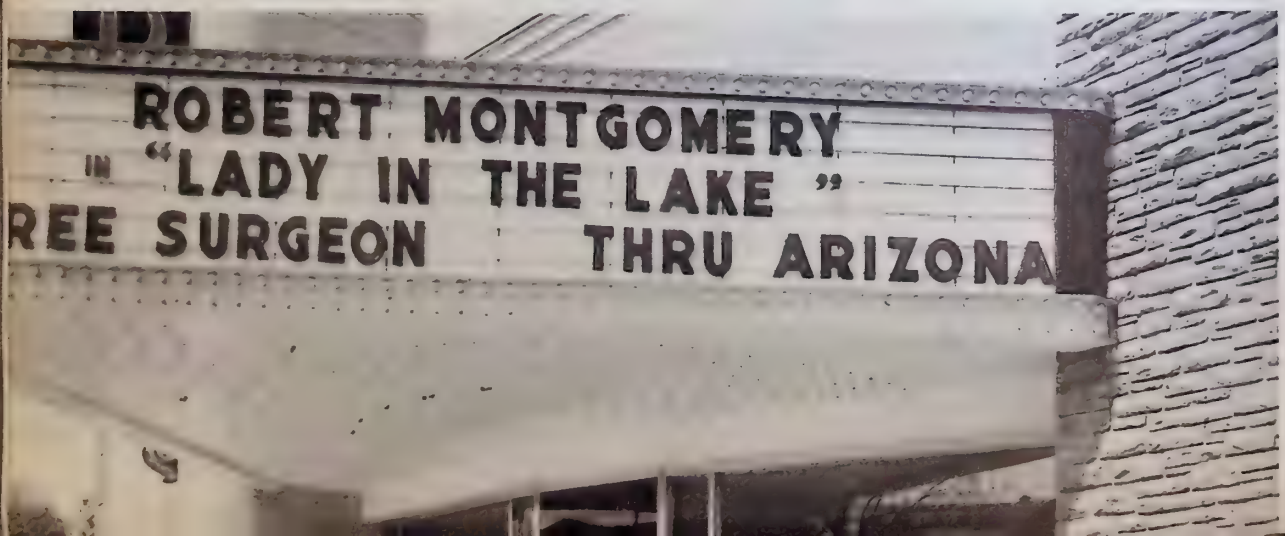
THE STANDEE AREA, as well as the foyer, is completely carpeted by Leedon, the covering being laid over padding by the Allen Industries. The movable posts, with associated ropes, are by Reliance Art Metal. The futuristic floral designs on the wall are well executed in canary yellow.



THE LADIES' LOUNGE is featured in peach with daylight blue neon lighting. A full mirror powder table and structural glass shelf extend the length of one wall. The peach toilet room has a terrazzo and marble stall partitions. The men's rest room is finished in apple green tile and marble.



THE MARQUEE AND MAIN ENTRANCE of the Covedale shows the use of Wagner letters on the American Sign's handiwork. The solid glass doors, by Libby-Owens-Ford, trimmed with stainless steel. The semi-circular box office is located in the center of the entrance area. By using similar glass doors inside the theatre, virtually all the foyer areas are visible from the street. The lobby mats are by the Perfo Mat and Rubber Company. The candy counter is arranged so customers in both the inner foyer and the outer lobby can be served at the same time.



Many Materials Combined for a Theatre in a Columbus, Ohio, Suburb

The Esquire Theatre

The lavish new Esquire Theatre is located at the threshold of Eastmoor, an exclusive residential suburb of Columbus, Ohio. The 1,000-seat cinema was designed for owner-operation by the Samson Operating Company.

The theatre, designed by the F and Y Building Service, is an imposing structure—a combination of buff brick, rough quarried limestone, five colors of terra cotta, a beautiful burgundy colored structural glass, and Bedford limestone. The modern design is unusual in that it has effectively used a combination of many varying materials in a very successful architectural study, achieving an outstanding result.

On the left half of the front elevation, a multi-colored terra cotta garden wall has been erected in front of a terra cotta shaft rising majestically to the roof, featuring a black and silver sylvan background.

Over the entrance, an impressive marquee is provided with specially lighted and ornamented nose. Superimposed on the attraction boxes, which form the sides of the marquee, are two signs in channel letters with colored neon. Entrance doors are solid slabs of selected birch with oblong vision panels and specially designed aluminum push-bars.

To the right of the entrance doors, a completely equipped confection and popcorn stand is provided for the convenience of the patrons.

The entrance lobby sweeps in a graceful curve toward the left to a second foyer, entered through a series of six additional slab doors. The color scheme of the entrance lobby is a gray-green, with a wine-colored treatment of the dropped ceiling which features an indirect lighting trough.

Passing through six slab doors into a second foyer, one enters a room in which the ceiling has a mild peach field with a slate-blue dropped panel motif which covers three-fourths of the entire ceiling and conceals gold neon tubing.

Further details of the color schemes and credits for the materials used and equipment installed will be found in the captions.

ON THE LEFT HALF of the front elevation, a multi-colored terra cotta garden wall has been erected in front of a terra cotta shaft rising to the roof, featuring a black and silver sylvan background. Over the entrance, the marquee is provided with specially lighted and ornamented nose.

Superimposed on the attraction boxes are two signs in channel letters with colored neon. The entrance doors are solid slabs of birch with oblong vision panels and especially designed aluminum push-bars. Attraction board and changeable letters are manufactured by Wagner Sign Service, Inc.





THE ENTRANCE DOORS are solid slabs of selected birch, with oblong vision panels and specially designed aluminum push-bars. The terra cotta front is by Federal Seaboard Terra Cotta; lobby mats by Perfo Mat and Rubber Company; steel trusses, bar joists, and deck by Macomber.



TO THE RIGHT of the entrance door, a completely equipped confection and popcorn stand is provided for the convenience of the patrons. The color scheme of the entrance lobby is a gray-green, with a wine-colored treatment of the dropped ceiling which features an indirect lighting trough.



THE ENTRANCE LOBBY sweeps in a graceful curve toward the left, to a second foyer, entered through a series of six additional slab doors. Passing through these doors a room is entered in which the ceiling has a mild peach field of slate-blue dropped panel motif over three-fourths the area.



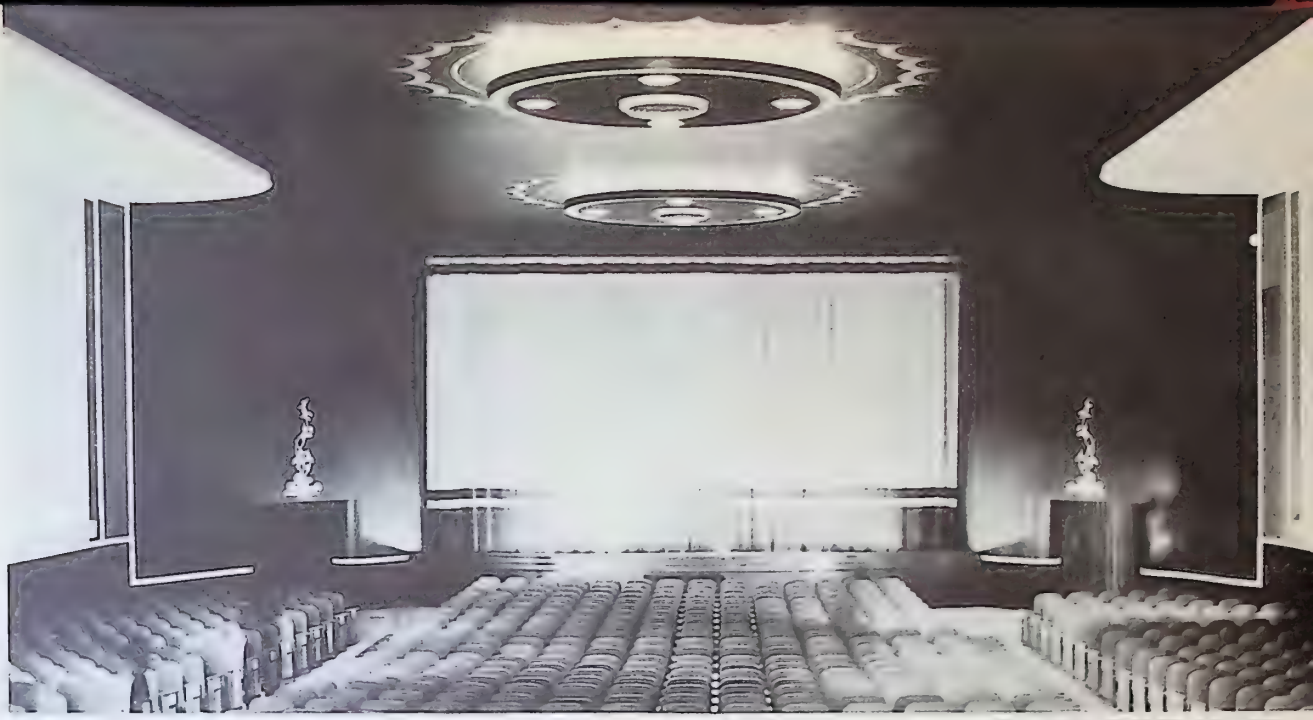
THE WEST ELEVATION is featured by a series of huge convex flutes which run from floor to ceiling. The wainscot of this room is of the same blue of the dropped ceiling, topped by a gold line. The remainder of the wall area is treated in a warm gray extending all the way up to the ceiling.

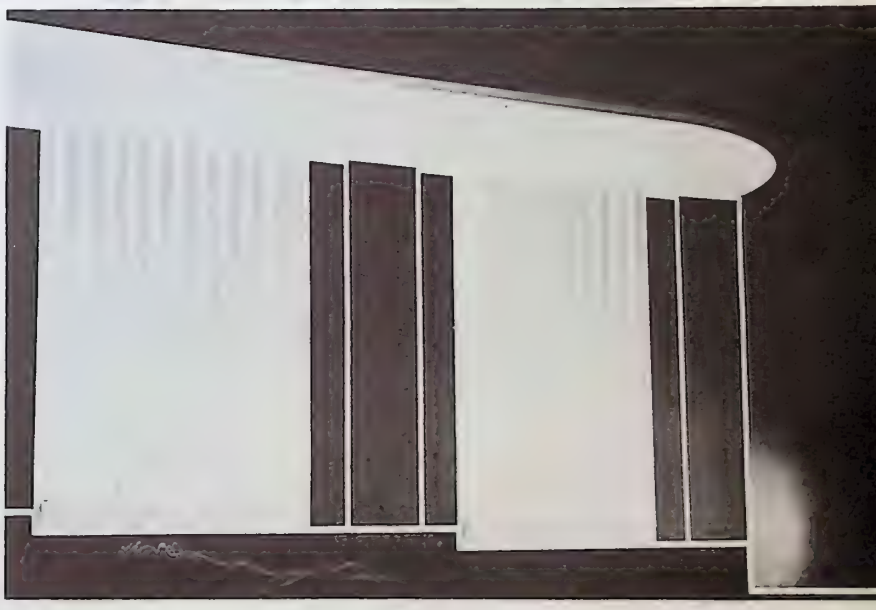
AT THE SOUTH END OF THE SECOND FOYER, the plaster is curved gracefully on the edges of a large recessed, 12-foot square, concealing neon edge lighting emphasizing a mural of semi-formal pastoral motif, which picks up the symbolism of the black-and-silver tree design on the facade.



A VIEW of the powder room is given below. In the projection booth (not shown) are Garminer Super projectors, with Ballantyne Royal Sound Master soundheads. Other credits include dimmers by Cutler Hammer, curtain controls by Clancy, directional signs by Voigt, chairs by Kroehler.







THE AUDITORIUM has a wainscot in delft blue. The rust velour-covered upper walls are accentuated by a series of large panels covered with lemon and silver candy-striped woven glass fabrics (by Thortel Fabrics). The vertical stripes end in a specially built ornamental light trough, which reflects light on cast plaster Romanesque design ornaments at the bottom of each panel. The auditorium ceiling's two large side panels are finished in straw color. Down through the center, the ceiling has been dropped approximately 8 inches. This dropped portion is finished in a dark maroon which sweeps down toward the proscenium and flares out toward the wing walls where the auditorium converges toward the proscenium arch. Down through the center of the ceiling, three large circular robin's-egg-blue placques, approximately 12 feet in diameter, have been suspended. Upon these placques special red and buff decorations have been provided which conceal indirect light of sunset gold neon tubing. These suspended placques conceal also the Agitair air-conditioning outlets which provide cooled or heated filtered air throughout the auditorium. In credit detail the air-conditioning system includes heating and cooling coils by McQuay; ventilating fans by Bishop and Babcock; Agitair diffusers by Air Devices, Inc. and a Koven Waterfilm hot-water boiler. The deep-well pump is by Fairbanks-Morse. Acoustical material and insulation for the theatre is by Kinsul. Carpeting throughout the house is by Alexander Smith and Sons Carpet Company, Inc. Approximately 1,000 Push-Back chairs, manufactured by the Kroehler Manufacturing Company, have been installed in the auditorium of the theatre. The theatre is an imposing structure—a combination of many materials. The modern design is unusual in that it has effectively used these combinations in a very successful architectural study, achieving success.



A Theatre Comes to Downtown Las Vegas, Famed Nevada Resort

The Fremont Theatre

In the heart of the business district of Las Vegas, Nevada, one of Hollywood's favorite places of sojourn, for one reason or another, the 800-seat Fremont Theatre was opened early last summer after the series of difficulties usually experienced—and some more that were inherent in the methods of fabrication and transportation of various items.

Owned by Earle C. Strebe, and operated by George Ingham, the theatre, constructed of concrete block and structural steel, is of the stadium type, erected on a lot 50 by 135 feet.

The facade below the soffit level is of fluted stainless steel down to the basal portion, which to a height of 3 feet is of Arizona flagstone. The entrance area is of terrazzo with also a specially designed rubber mat. Six 40 x 60 poster frames set symmetrically three on a side, facing the island box office.

In the center of the foyer, flanked by the entrances to the retiring rooms, is the candy counter, finished in green tufted leatherette. The lobby under the stadium has beige walls and a white ceiling, while the ramps into the auditorium are done in beige.

The walls of the auditorium—finished with Pearlite acoustic material on the lower portion, with the upper part retaining a quasi-unfinished effect—are green, trimmed with beige. The ceiling is white, picking up the reflected light from the gold neon tubing in the troughs on either side.

Chairs throughout the theatre are done in coral, those in the auditorium having leatherette bottoms and mohair backs, while those in the stadium section have mohair on both the seat and the back.

The toilet rooms have light green terrazzo floors with the walls of much the same shade. The ladies' powder room is carpeted and also has a circular mirror over the dressing table.

As the theatre opened, the operational policy was that of a first-run, with a top adult evening price (general admission) of 65 cents and 85 cents for the loge (stadium), with matinee prices, respectively, 50 and 65 cents.

THE FREMONT THEATRE, in downtown Las Vegas, Nevada, is dominated by a huge marquee which, having encountered "free trouble" en route from Los Angeles, had not been entirely rebuilt when this picture was taken. The bottom 3 feet of the building is finished in Arizona flagstone, with fluted stainless steel from that point to the soffit. Three Sealuxe 40 x 60 display frames—two flat and one curved—are used on either side of the entrance. Although the signwork utilized various items of the Wagner Sign Service, the changeable letters, in two sizes, are Bevelite.

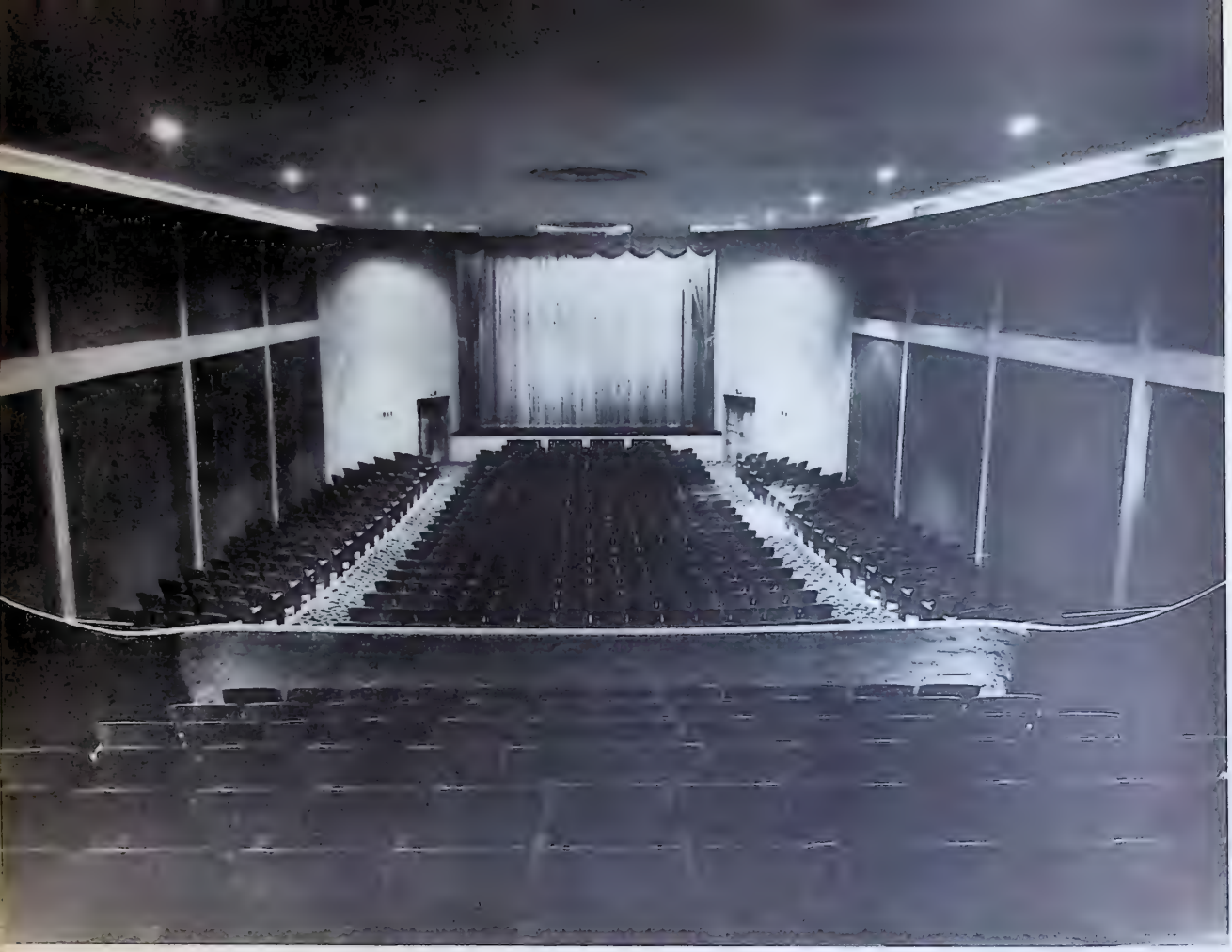




THE AUDITORIUM has green walls trimmed in beige, with a white ceiling that picks up the light of the gold neon tubing in troughs on each side. The chairs are finished in coral, in the auditorium proper with leatherette bottoms and mohair backs and in the loge they are all of mohair.

THE PROSCENIUM is adorned with green, festooned valances, a bright gold braile curtain, and light green legs. The exit and ramp drapes are of light green, high-pile velour. An Autodrape curtain machine controls the travelers on the two 16-foot lengths of Besteel medium-duty track.





FROM THE REAR OF THE STADIUM, looking toward the screen, it can be appreciated the advantages to be gained where portions of the theatre are left in a quasi-unfinished condition—providing the materials result in the proper acoustic characteristic for the theatre. In this way it is possible to make good uses of the materials' natural effects produced in the processes of actual construction.

THE CONCESSION STAND, of green tufted leatherette, is in the center of the lobby, flanked by entrances to the retiring rooms. Lobby under stadium has beige walls and a gold ceiling, with beige ramps. Rest rooms have light green walls, with light green terrazzo floors in the toilet areas. The Ridgefield Wilton carpet has a maroon base, figured with a beige palm tree. Area lighting is by neon.



REFERENCE CREDITS

THE FREMONT THEATRE

Las Vegas, Nevada

OWNER: Earle C. Strebe.
OPERATOR: George Ingham.
ARCHITECT: Douglas Burton.
DECORATOR: F. W. Sharpe Decorating Company.
SEATING CAPACITY: 800.
COST OF BUILDING: $135,000.
COST OF EQUIPMENT (including air conditioning): $40,000.

AIR CONDITIONING: Two 25-ton units, by United States Air Conditioning Company.
CARPETS: Ridgefield Wilton, by A. and M. Karagheusian.
CHAIRS: by Heywood-Wakefield Company.
CHANGEOVERS: Manufactured for Motiograph, Inc.
COINCHANGER: by Johnson Fare Box Company.
CURTAIN CONTROLS AND TRACK: by Automatic Devices Company.
DISPLAY FRAMES: Sealuxe, by Universal Corporation.
FILM CABINETS: Neumade, by Neumade Products Corporation.
LENSES: Super Cinephor (Balcoted), by Bausch and Lomb Optical Company.
PROJECTION LAMPS: Peerless Magnarc, by J. E. McAuley Manufacturing Company.
PROJECTION MACHINES: Model AA, by Motiograph, Inc.
RECTIFIERS: by McColpin-Christie Corporation.
REWINDERS: Automatic, by Goldberg Brothers.
SCREEN: Da-Lite, by Da-Lite Screen Company, Inc.
SIGN FRAMEWORK: Wagner Sign Service, Inc.
SIGN LETTERS: Bevelite, by Theatre Specialties Inc.
SOUND: Motiograph-Mirrophonic, by Motiograph, Inc.; Voice of the Theatre speakers, by Altec Lansing Corporation.
SUPPLY DEALER: B. F. Shearer Company and National Theatre Supply Division of National-Simplex-Bludworth, Inc.
TICKET-ISSUING MACHINES: Automaticket, by General Register Corporation.
TICKET CHOPPER: through B. F. Shearer Company.

New Cinema Honors "Daddy of the Blues" in Memphis, Tennessee

The W. C. Handy Theatre

Honoring the composer of the "Memphis Blues" and the "Saint Louis Blues," the W. C. Handy Theatre brings to the colored people of the Orange Mound district of Memphis, Tennessee, a 1,056-seat theatre designed and equipped to handle the best in stage and screen entertainment.

The theatre, in compliance with all regulations and ordinances, is erected with structural steel, concrete, and brick —the customary fire-proof type of construction.

The facade of the theatre is faced with Carrara glass, in beige and royal blue with red trimmings. The V-type marquee, taking three lines of changeable letters, is topped by a name sign with neon letters.

The interior lobby—off which are doors to the milk bar, manager's office, rest rooms, and storage closets—is finished in a cream color. A large portrait of W. C. Handy is a decorative feature of the lobby.

The milk bar has been so arranged that it does double duty—as a source of refreshment for the theatre patrons on the inside and for transient passers-by.

The side and rear walls of the auditorium are finished with Celotex. The draperies are gold, trimmed in aqua, with the front curtain in aqua, and the other stage drapes in gold.

The ladies' toilet room is finished in pink tile, the men's in cream and black tile.

As the theatre opened, it was the plan to operate as a first-run motion-picture house, with the show augmented every third week by a stage presentation featuring top colored entertainers.

THE ENTRANCE AND MARQUEE are highly illuminated. The upright sign on top of the marquee is animated. The soffit is illuminated by parallel rows (at right angles to the facade) of white neon tubing. Since the entrance faces north, it is necessary to provide a vestibule which must be heated in the winter to forestall a rush of cold air into the lobby when the front doors are opened. In honor of W. C. Handy, the "daddy of the blues," the theatre opens each day with the playing of the "Memphis Blues" and closes with playing the even more famed "Saint Louis Blues."



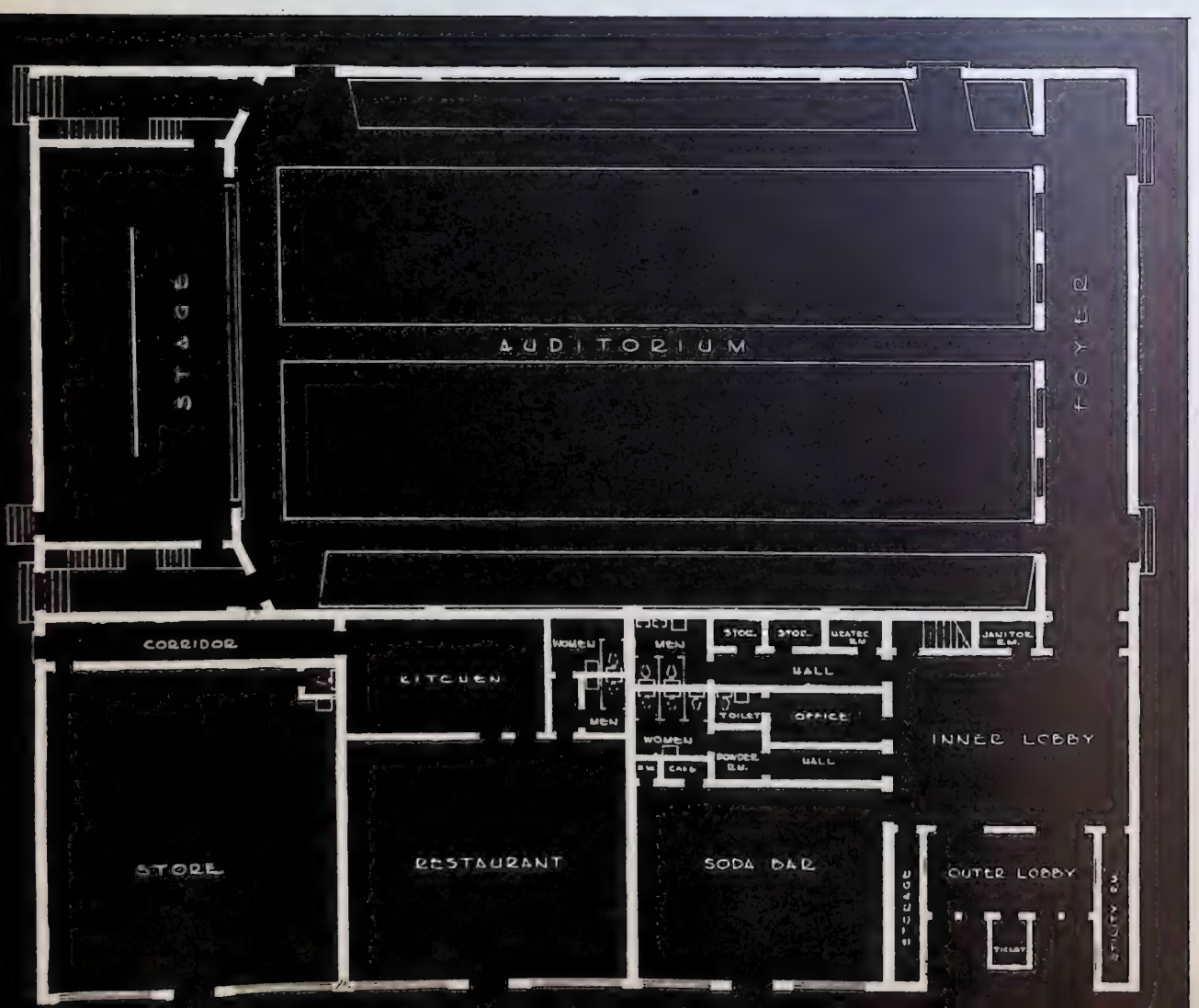


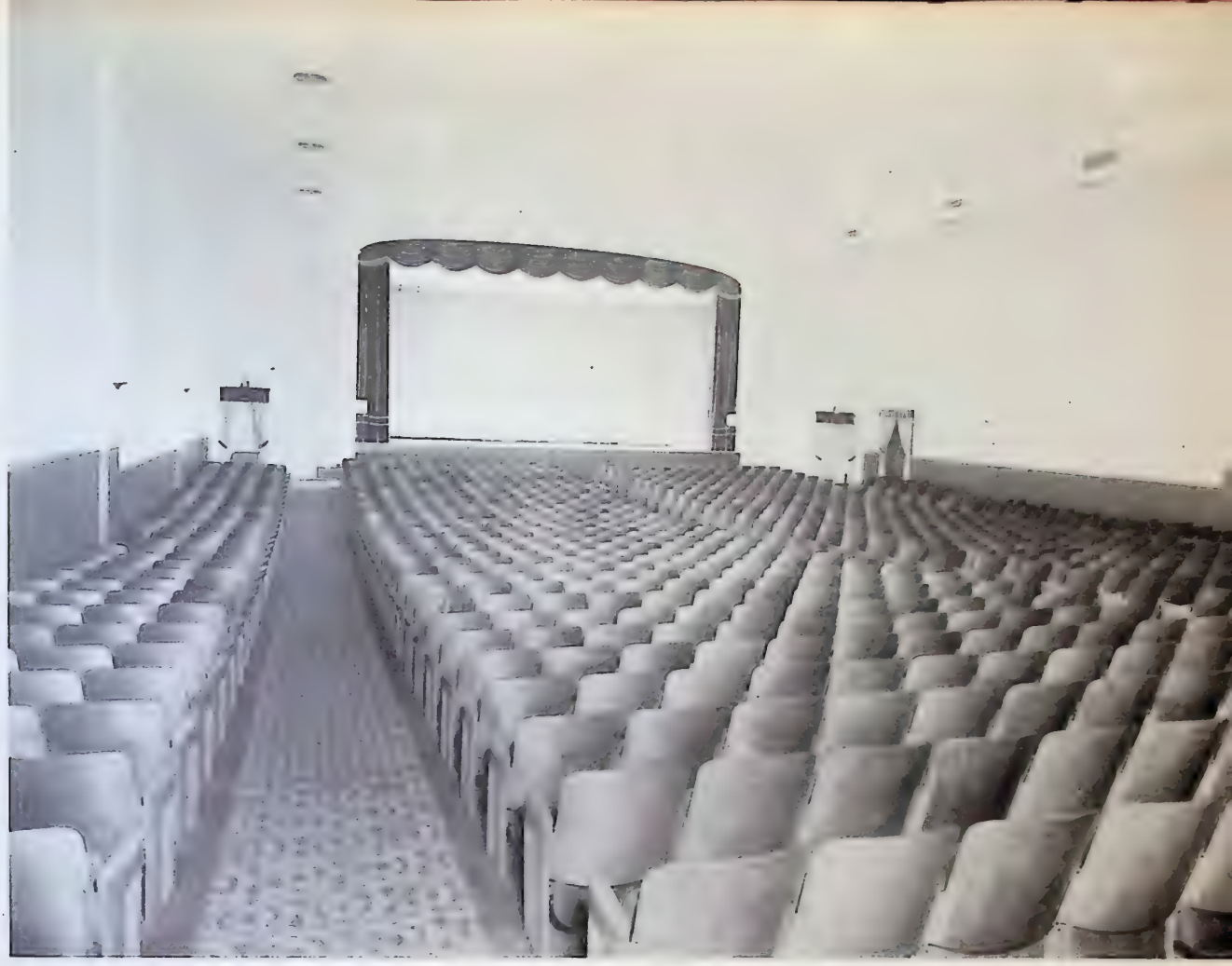
THE LOBBY is spacious, with doors to the milk bar, manager's office, rest rooms, storeroom for popcorn and candy, and stairs to the two balcony rooms and the projection booth. The milk bar—for milk, ice cream, and soft drinks—is a large room with a seating capacity of 30 to 40 persons.



THE FOYER is long and fairly wide, at the rear of the theatre proper. It has a standee rail, mostly of glass block with concealed lights. Entrance and lobby have terrazzo floors, but the foyer and aisles are carpeted. An intercommunication system is connected with all parts of the theatre.

THE FIRST FLOOR PLAN shows how everything fits together, providing all the public and private conveniences and at the same time giving maximum space to all commercial areas. Note especially the positioning of the soda bar, so that theatre patrons, as well as passers-by, may be accommodated. Note, too, the service corridor primarily for the restaurant and its kitchen. By designing halls leading to the toilet rooms, it has been possible to concentrate all the plumbing for theatre, soda bar, and restaurant in the smallest possible space for the easiest maintenance.





THE AUDITORIUM of the W. C. Handy Theatre is 64½ by 95 feet and seats 1,056 persons. The floor has a reverse slope. As with other similar theatres, the chairs all have wood backs and leather upholstered seats. The stage is designed for floor shows and will accommodate a large band. Three-color footlights are provided, with two rows of drops. Under the stage are toilet and dressing-room facilities for performers, and a large room for gas and electric meters and the three 25-hp. compressors for the air-conditioning system. The heating and cooling systems are combined.

REFERENCE CREDITS

THE W. C. HANDY THEATRE

Memphis, Tennessee

OWNER AND OPERATOR: Chalmers Cullins, Ed Cullins, Nate Evans, Louie Weaver, and Kemmons Wilson.
ARCHITECT: Raymond B. Spencer.
DECORATOR: Louis P. Wulff.
SEATING CAPACITY: 1,056.
COST OF BUILDING (INCLUDING STORES): $160,000.
COST OF EQUIPMENT (INCLUDING AIR CONDITIONING): $50,000.

AIR CONDITIONING: Frigidaire, by Frigidaire Division of General Motors Corporation.
CARPETS: by Mohawk Carpet Mills, Inc.
CHAIRS: Bodiform, by American Seating Company.
CURTAIN CONTROLS AND TRACK: by Vallen, Inc.
DRAPERIES AND STAGE CURTAINS: through Premier Studios.
LENSES: by Bausch and Lomb Optical Company.
PROJECTION LAMPS: Simplex-High, made for National Theatre Supply.
PROJECTION MACHINES: Super Simplex, by International Projector Corporation.
RUBBER MATS: by American Mat Corporation.
SCREEN: Walker Deluxe PM, by Walker American Corporation.
SIGN AND MARQUEE: Balton and Sons.
SIGN LETTERS: Wagner Sign Service, Inc.
SOUND: Simplex Four Stat, dual channel, by International Projector Corporation.
SUPPLY DEALER: National Theatre Supply Division of National-Simplex-Bludworth, Inc.
UNIFORMS: by Brooks Uniform Company.
VENDING EQUIPMENT: Candy case, by Columbus Show Case Company; soda fountain by Stanley Knight; popcorn machine, by Star Manufacturing Company, Inc.; ice cream machine, by Mills Industries, Inc.

THE REAR VIEW of the auditorium shows the placement of two special viewing rooms, one on either side of the projection booth, where there are two projectors. All electric wiring is as complete as possible, with remote control of house and stage lights from the first floor, the projecion room, and a large panel board on the stage. Recessed ceiling lights provide the general auditorium illumination.



Double-Size Seats Attract the Double-Size, and Couples, in Dallas

The Major Theatre

The Major Theatre, at 2830 Samuels Boulevard, in suburban East Dallas is the newest addition of Phil Isley Theatres, Inc., of Dallas. Credit for planning this theatre goes to Raymond Smith, architect, who drew the original plans, and Pettigrew-Worley and Company, who designed the front. The building was constructed by the Major Construction Company, and interior decoration is by R. V. Churchill. The theatre is under the management of Edward P. Carleton.

The acoustical problem for the Major, which has a seating capacity of approximately 1,125 people, was easily solved by the use of Lempit on the walls. This material is blown onto the walls and, after it has set, can be painted. Noise in the theatre is further deadened by the use of acoustical plaster on the ceiling of the foyer.

Along the aisles in the balcony are double seats. Originally designed for the use of couples, these seats have found favor with larger patrons as well. Also located in the balcony is the cry room, and here, again, the larger seats have been installed in addition to those of regulation size.

The air conditioning for the whole theatre is furnished by one 20-ton and one 40-ton air-conditioning unit of the United States Air Conditioning Corporation. (Many theatre owners—of existing as well as new houses—are seriously pondering the use of packaged units, since these can be operated singly or in groups as needed and since their operation is automatic and do not require constant operational attendance.)

The projection room is air-conditioned and has its own rest-room facilities for the projectionists. The equipment includes a pair of Century projectors backed up with Mogul high-intensity projection lamps of the Strong Electric Corporation. Sound is by RCA.

In an area with an estimated drawing power of some 6,000, mainly from the social group denominated the "laboring class," the theatre opened in the summer with a policy of three changes a week, featuring the best action-type dramas that can be made available.

THE ACOUSTICAL CHARACTERISTIC of the auditorium of the Major Theatre has been achieved in two ways: First, Limpet was used on the wall. (The material is blown onto the walls and, after it has set, can be painted as desired.) Second, an acoustical plaster was used on ceiling. An indirect trough-lighting system is used, arranged in circuits so that the blues and lavenders can be accentuated, in the large central bay as well as in the smaller ones on either side. The aisles are carpeted. Including the balcony and the cry room, the theatre will seat approximately 1,125 people.





LOOKING TO THE REAR of the auditorium, the method of achieving the staggering of seats can be easily appreciated: in the center section the rows are alternately composed of 13 and 14 seats, rather than the more common practice of varying the widths of the chairs in the row itself.

IN THE BALCONY, along the aisles, seats approximately double width have been used. While originally intended to serve as a single seat for couples, the outsize chairs have been widely acclaimed by that portion of the patronage more amply proportioned amidships. Cry room is at left.





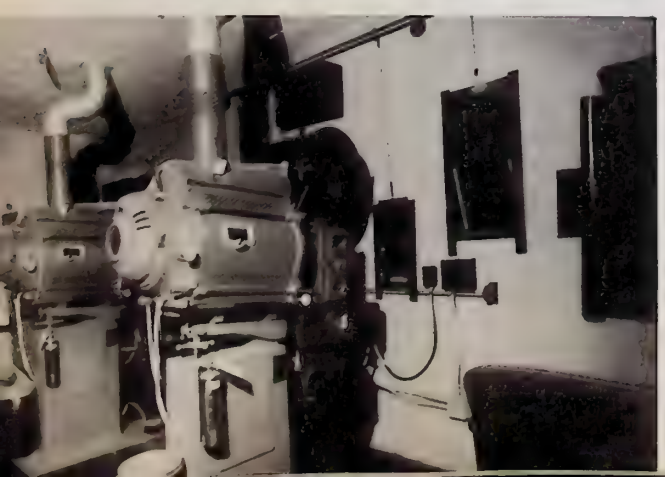
THE LOBBY of the Major Theatre is spacious, with plenty of hold-out space as well as opportunity to do business with the extra profits department. The popcorn machine is set in a special housing finished in a material as the candy stand. The ticket box has also been similarly finished.

THE CRY ROOM, located at the rear left of the balcony, also has a number of the double-width chairs of the same sort that make the balcony of special inerest to couples and the oversized. Unlike many installations the window has been set in the same plane as the theatre's rear wall.



THE PROJECTION ROOM is equipped with projectors by the Century Projector Corporation, Mogul lamps by the Strong Electric Corporation, and sound by the Radio Corporation of America. The room is air-conditoned, and private rest-room facilities have been installed for the projectionists.

AIR CONDITIONING is effected through the installation of two units manufactured by the United States Air Conditioning Corporation, one unit being of 20-ton capacity and the other of 40-ton capacity. The conditioned air is distributed throughout the duct system, equipped with ceiling outlets.





Colonial Period Is Well Remembered in Nassau County, New York

The Malverne Theatre

In the heart of Long Island's Nassau County, where many an event took place which helped to weld Thirteen Colonies into the New Nation, the Kenney Amusement Corporation has opened its Malverne Theatre, designed by John and Drew Eberson to recall to Malverne's 6,000 population these formative years, as well as to give the present generations a theatre of the first order, de signed for comfort and pleasure.

A fire-proof structure, of brick and steel construction, the theatre has been designed in a brick Neo-Colonial style. A marquee, triangular with a symbolic mask in the nose, dominates the front by virtue of the back-lighted program boards rather than great displays of the neon tube-bender's art. On each side of the entrance way are two display frames —the "Now Playing" on the street side, the "Coming" (or "Next Attraction") on the returns—each of which is designed to hold the special 30 x 40 art displays and two scene stills.

The lobby, with its walnut-paneled dado, is made notable by the use of two long and, by comparison relatively narrow, murals, showing on the ingress side, a map of Long Island and, on the egress side, the artist's conceptions of some of the events of the area's rich historical background.

The auditorium, seating 688, features wall coverings in rose, silver, and blue damask over rock wool, as well as features which take advantages of the peculiar properties of black light. Rambusch Decorating Company did the work.

The lounge rooms, for both men and women, are sumptuously furnished, with the wall papers done in exotic design, the ladies' room emphasizing rose and silver, the men's green and silver.

It is not unusual for theatres, especially the community type, to provide a cry room for the convenience of mothers with young children. Such has been done in the Malverne, but with an unusual management angle. It was obviously the conclusion that the major business in the cry room was during the matinee and that in the evening the room was unused. So to make this spot usable at all times, special amplifying equipment was added for the convenience of hard-of-hearing patrons, and, for those who needed hearing aids, the equip-ment was made available. Thus this often overlooked segment of the population was given facilities—including a private viewing room—for adding to the pleasure of theatre attendance and in virtually their own theatre!

As the Malverne opened, the policy was one of single features on a continuous-performance basis, with an evening adult price of 60 cents and a children's admission of 25 cents.

THE FRONT of the Malverne Theatre, designed by John and Drew Eberson, is in the Neo-Colonial motif, dominated by a triangular marquee constructed by Continental Signs, Inc. to use letters of the Adler Silhouette Letter Company. The display frames, designed to accommodate 30 x 40's along with a pair of 8 x 10 star or scene stills, are by the Lobby Display Frame Corporation. In the island box office will be found General Register Corporation's Automaticket registers and Brandt automatic coinchangers. The nose of the marquee is adorned with a symbolic mask, neon-framed.





THE FOYER, as well as the lounge portion of the men's and ladies' suites, is carpeted with a popular Crestwood pattern, woven by the Alexander Smith and Sons Carpet Company. The various items of theatre equipment installed in the house are through the Capitol Motion Picture Supply.

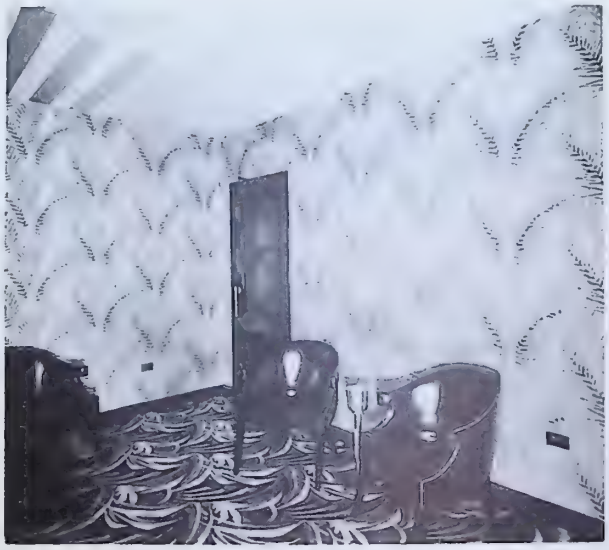


THE LONG MURALS, adorning the two sides of the lobby, above the walnut-paneled dado, present on one side (above) a map of Long Island and on the other (below) pertinent historical scenes. The map emphasizes Kings and Queens Counties as well as the Malverne's own Nassau County, all figuratively depicted as a Colonial battleground. The mural on the opposite wall recalls the days when, despite the large number of eight-sides churches, a plot to kidnap Gen. George Washington was hatched in Flatbush and pirates and smugglers frequented the shore; when Sgt. Ellia Churchill, wounded at the capture of Fort Salonga, was awarded the first Purple Heart; when Nathan Hale spied on the British positions; when negotiations with the Indians were of vital importance; and when Capt. Adrian Black, with his five ships, first circumnavigated Long Island.





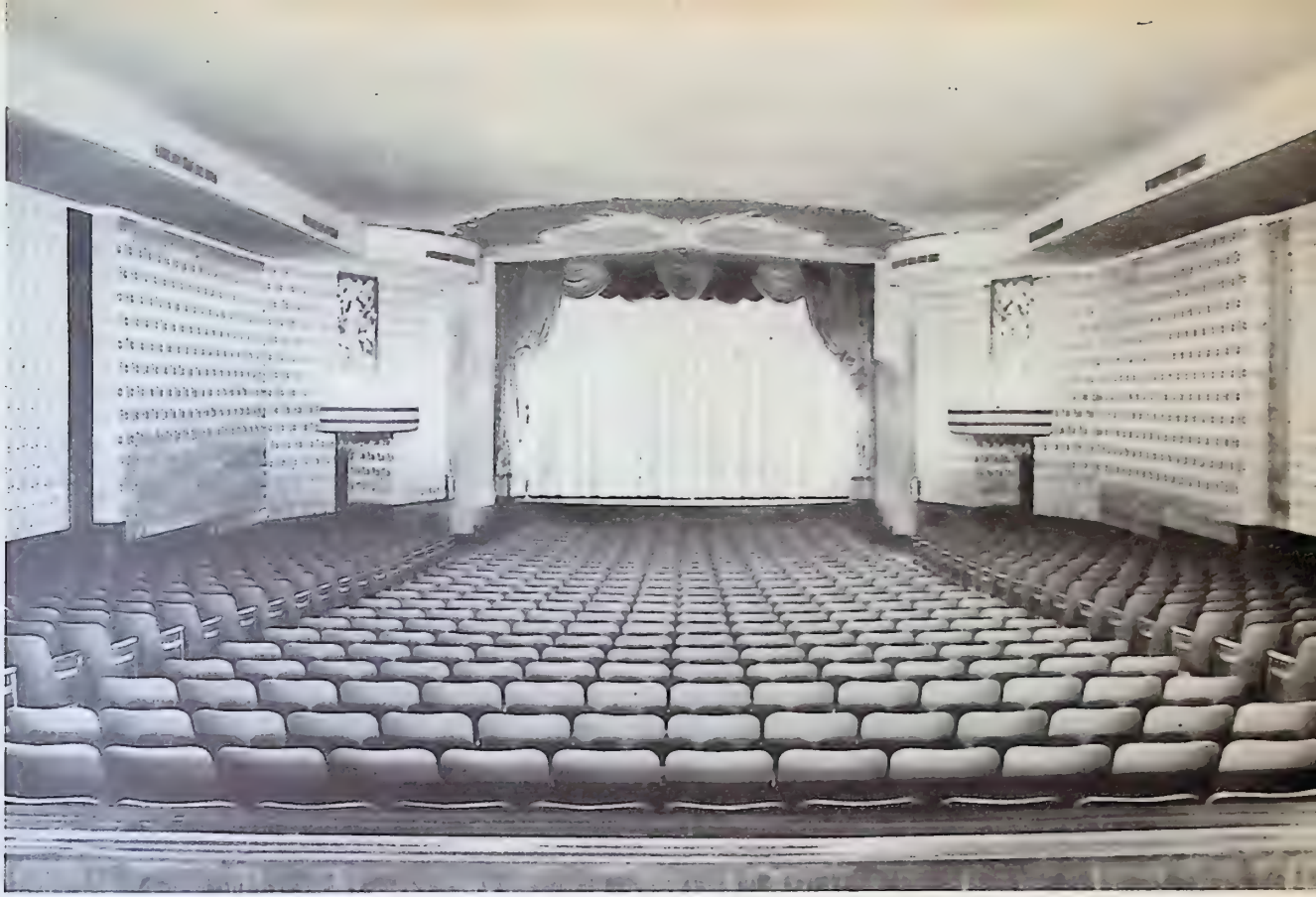
THE CRY ROOM serves a dual purpose in the Malverne Theatre. During the day it is used for its original purpose, but at night, the room is used as a private viewing room for the hard of hearing. For these patrons' pleasure, sound is especially amplified, and instruments are also for use.



THE MEN'S RETIRING ROOM is comfortably furnished with arm chairs, with convenient ash-receivers. The paper on the wall is of an exotic design with green and silver the dominating colors in the frond design. The theatre's lighting fixtures are by the Rambusch Decorating Company.

THE LADIES' SMOKING ROOM is larger and more sumptuously furnished than the comparable men's retiring room. The well-stuffed chairs, convenient ash-receivers, and floor lamps add distinction to the room whose walls are done with an exotic paper with colors of rose and silver.





THE AUDITORIUM has 688 chairs of the Ideal Seating Company's Chief line. The curtains and stage drapes are through the Charles H. Kenney studios, Inc., with curtain controls and track by Automatic Devices Company. Fabrics by Dazian's, Inc., Frankel Associates, Maharam, Kaplan.

THE PROJECTION ROOM (not shown) possesses projection machines and lamps by Brenkert; lenses by Bausch and Lomb; sound by the Radio Corporation of America; and miscellaneous booth equipment by Neumade. The changeover was made for Brenkert. The screen is an RCA Evenlite job.



In Barranquilla, Colombia, Loew's International Opens a New Theatre

The Metro Theatre

The Metro Theatre, in Barranquilla, the third city of Colombia and its chief port, is a completely modern, air-conditioned cinema, located on the border between the city's business and residential areas at a point where the marquee and the roof sign may be easily seen from three palm-lined streets.

The white front of the theatre, gleaming in the Caribbean sun, is dominated by a marquee using the old-type glass letters set in metal, an employment which here served to augment the appearance of the theatre.

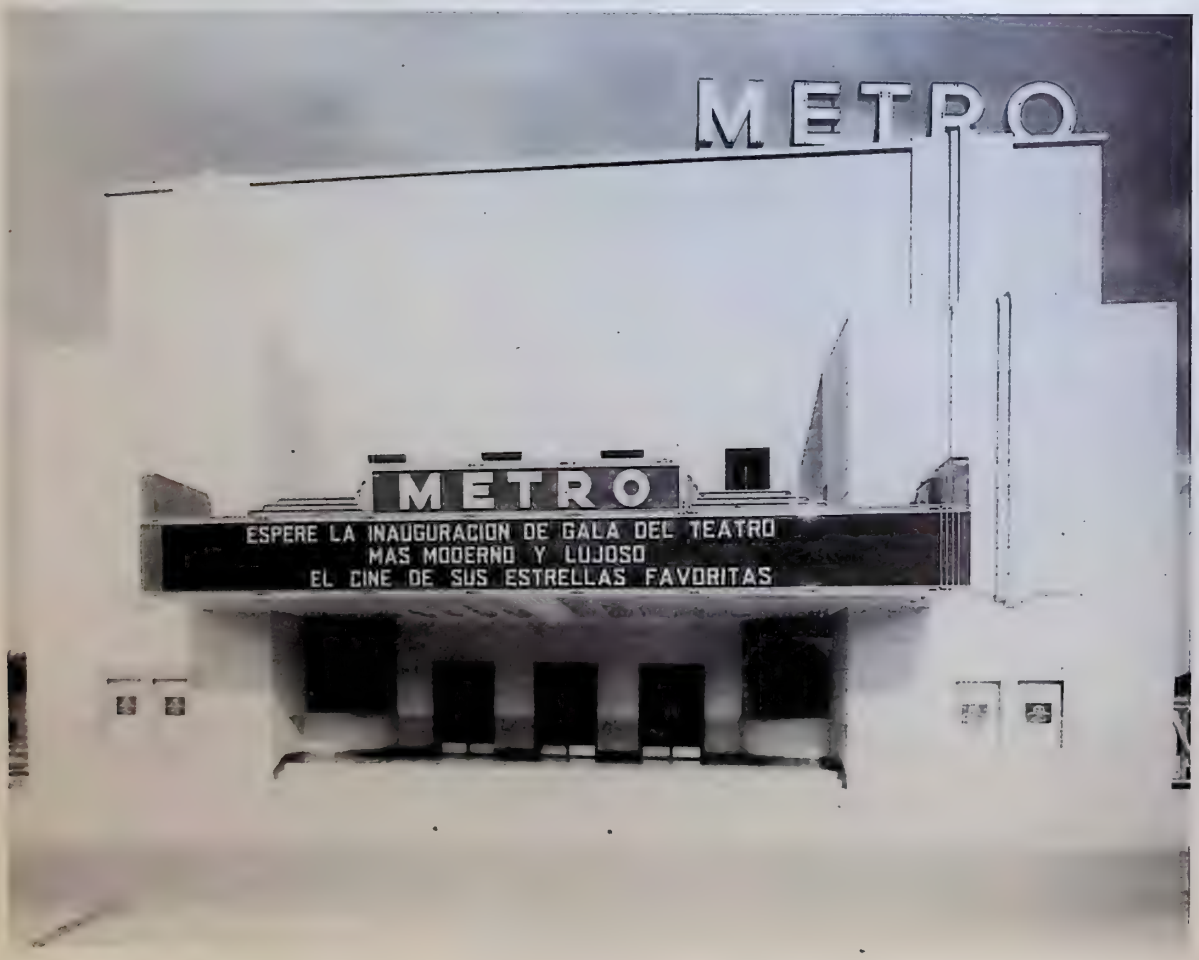
After passing any of the three sets of double entrance doors and the outer lobby, the patrons come to the inner lobby, where the floor is of tile. The wood panels are decorated with lithographs of the favorite stars of the patrons, with some displays for posters on coming attractions. Facing the outer lobby are other two-sheet frames. The chairs of the inner lobby are leather-upholstered and of the club type.

The auditorium seats 1,000, with chairs obtained from the American Seating Company. Besides the right- and left-center aisles, there are two outside aisles, cloister-like, outside the hang of the upper wall of the auditorium proper. A detail not found in many American auditoriums is the ash receiver on the back of practically every other seat.

The projection room seems quite typical of those in the United States, mainly because of equipment not in the least unknown north of the border. Among the equipment are two Simplex E-7 projectors, manufactured by the International Projector Corporation; Peerless Magnarc lamps, manufactured by the J. E. McAuley Manufacturing Company; and generators, manufactured by the Hertner Electric Company; and sound, judging from the amplifiers installed, manufactured by Motiograph, Inc. A slide projector, manufactured by the Charles Beseler Company, is also included.

As the theatre prepared for (as the marquee announces) "The Gala Opening of the Most Modern and Luxurious Theatre, the Cinema of Your Favorite Stars," the schedule provided for three shows every day, with an extra performance on Sundays and holidays.

THE METRO THEATRE in Barranquilla, Colombia's third city and chief port, gleams in the Caribbean sunshine as the marquee sets forth the admonition to the general public to "Watch for the Gala Opening of the Most Modern and Luxurious Theatre, the Cinema of Your Favorite Stars." How relatively modest that superlative turned out to be is shown in these pages by the photographs provided by Sam Kreisler and associates of Loew's International Corporation. The theatre is of fire-proof construction and was built wherever it was possible to do so, by utilizing local labor supplies.





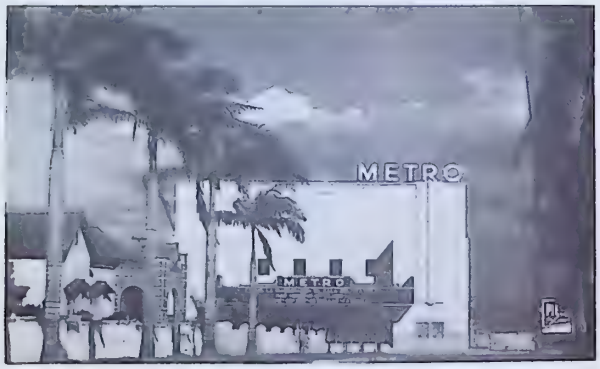
THE AUDITORIUM of the Metro Theatre is equipped with 1,000 American Seating Company chairs. Three differences from American auditoriums will be noted. In the first place the main body of the center section has 15 seats, against the customary 14. Then practically every other seat has affixed an ash receiver. But the striking treatment is the cloister effect of the side aisles, by making the aisles outside the principal width of the auditorium and seating area. The decorative treatment of the side walls further enhances the more conventional artistic treatment of the proscenium.





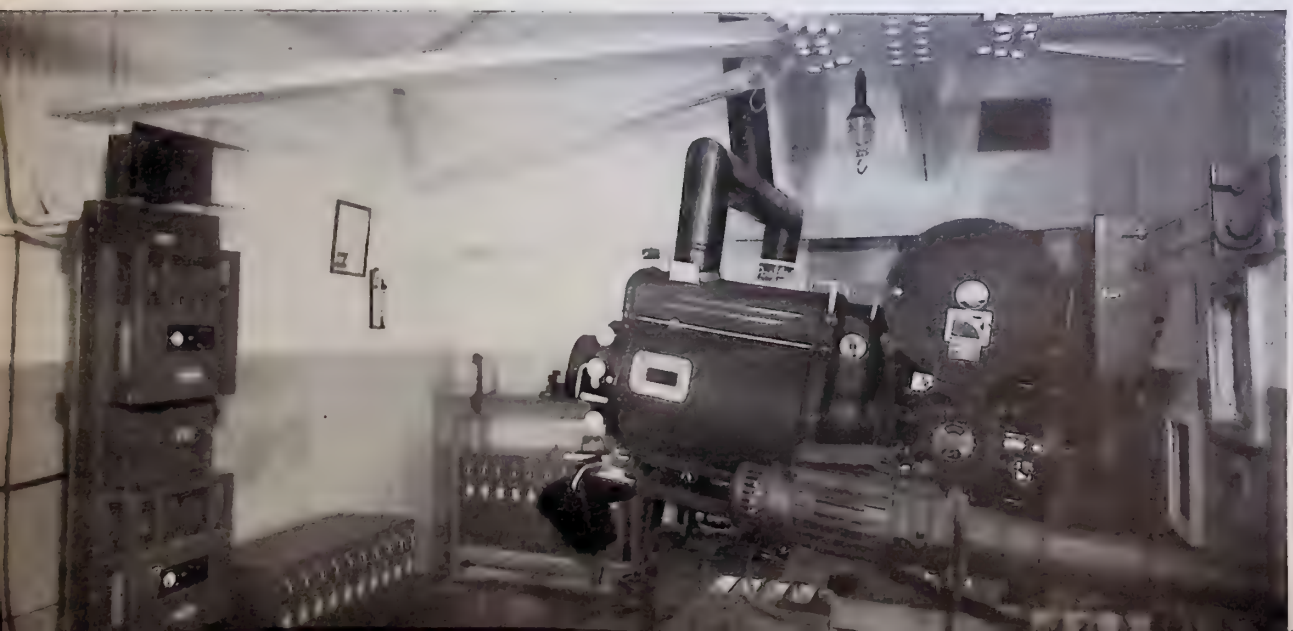
THE FOYER of the Metro Theatre is modernistically simple, with its multi-tessellated pattern in the tile floor, the wood finish for the doors and paneling above, which are blocks of the same three colors as are used in the geometrical pattern on the side walls of the auditorium. Leather-upholstered club chairs of modern design and benches provide seating space for a few of the patrons awaiting the start of the show. Posters, about the 40x60 size, announce the coming attractions, and large, framed star stills are the additional decorations changeable at will.





THESE TWO EXTERIOR VIEWS of the Metro Theatre better show the details of architectural design and the tropical setting. Note particularly the handling of the roof sign and its placement so as to become the focal point of the vista down the avenue bordered by rows of tall, majestic palms.

THE PROJECTION ROOM is equipped with Simplex E-7 projectors, Peerless Magnarc arc lamps, and sound which seems, because of the amplifier rack at the left, to be Mellogragh-Mirrophonic. The other booth equipment indicates that it might have originated in the United States. The slide projector in the foreground is by Beseler. From the appearance of this projection room, there is nothing that denominates this as Colombian, what with equipment the like of which can be found in any booth in the United States. This is indeed a tribute to American manufacturers.



Loew's International Opens an M-G-M Showcase in Valparaiso, Chile

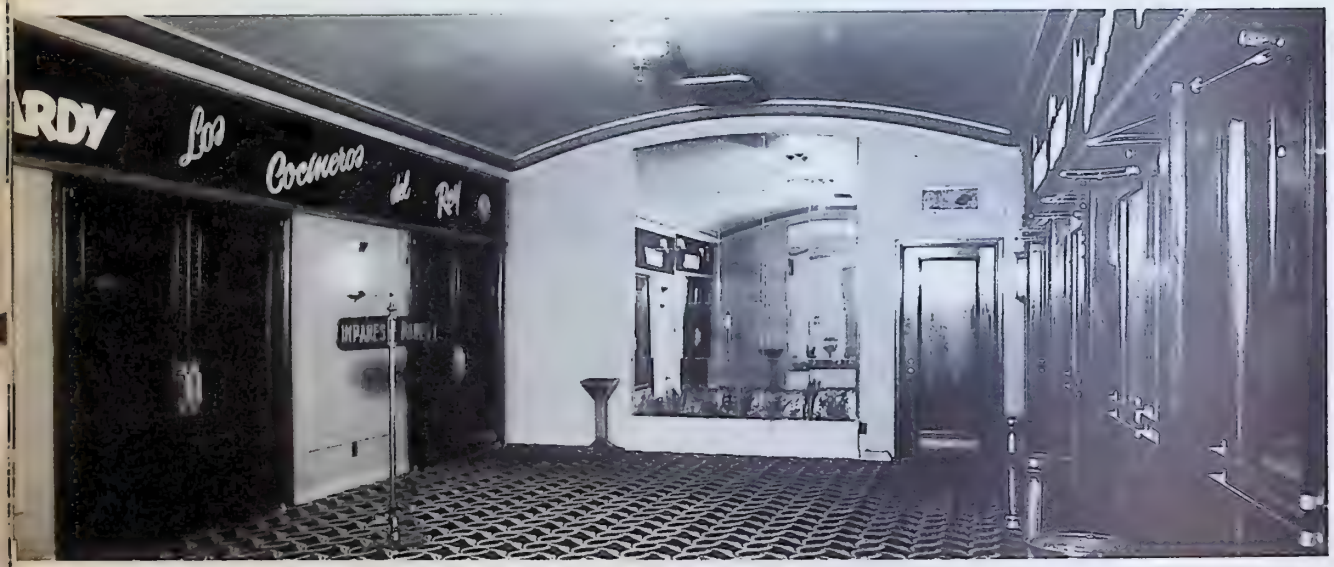
The Metro Theatre





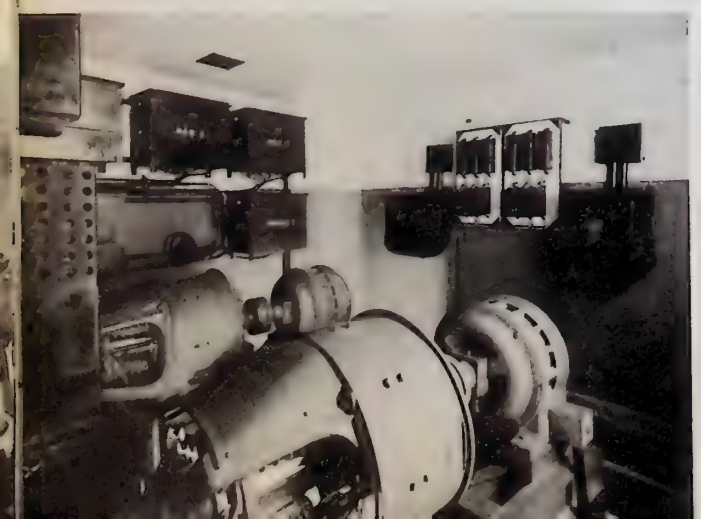


THE OUTSIDE of the Metro Theatre, seen by either night or day, presents a striking appearance, but no less impressive than the interior of the house, as set forth in this series of pictures provided by Sam Kreisler and his associates of Loew's International Corporation. It is interesting to see how the side wall has been stepped down as the auditorium room decreases in height as it nears the stage. While Valparaiso is about as far south of the equator as Charleston, South Carolina, is north of that line, the 6:15 p.m. showing reflects different cinema habits obtaining in Latin America.

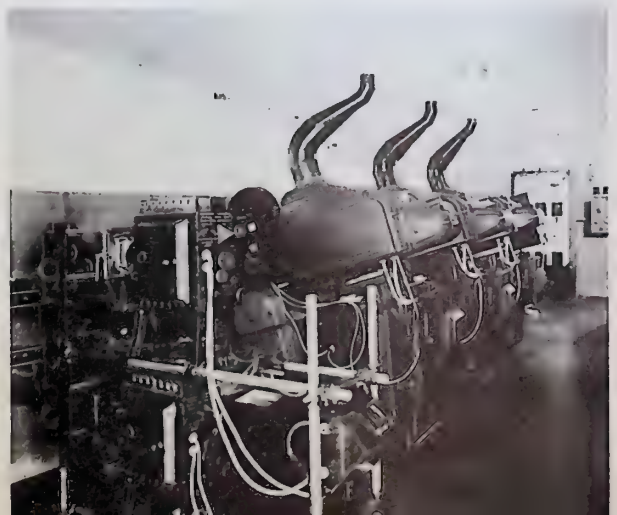


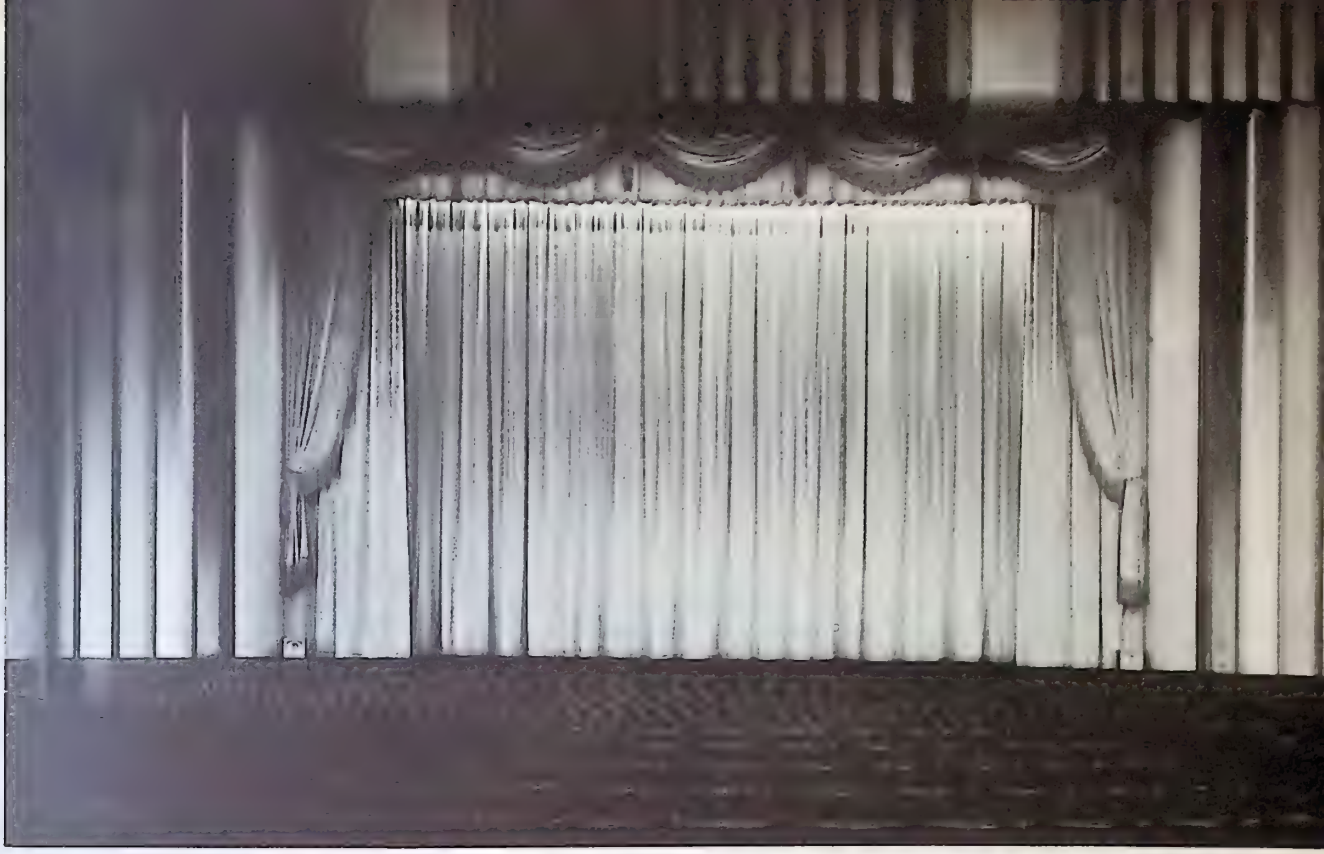
THE SECOND LOBBY presents at first sight a feature never seen in American theatres: a standee sign indicating the side of the auditorium on which the seats are numbered either odd (impares) or even (pares). Many theatres in Latin America sell tickets for specific seats (as done in this country at legitimate theatres) instead of general admissions, good for any seat a patron can find at the price. It is interesting to note that the banner space above both sets of doors is the same, and, presumably a coming attraction. The mirrors give an added illusion of width.

THE GENERATOR ROOM shows the two motor-generators installed to provide the direct current for the projection room's arcs. Here are the necessary electrical connections and controls, as well as the four junction boxes, one each for the three projectors and one for the special-effects machine.

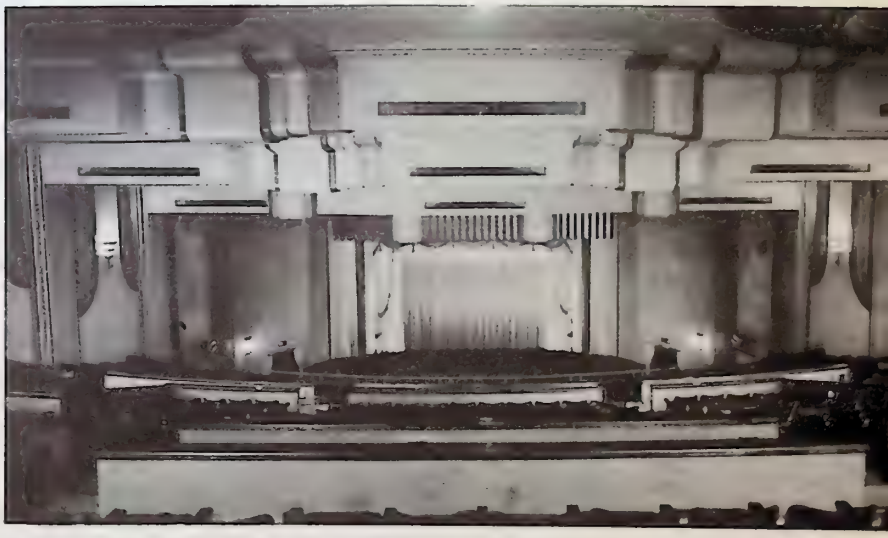


THE PROJECTION BOOTH is equipped with three Simplex E-7 projectors, with Peerless Hy-Candescent lamps, and a Brenkert special-effects machine. The open knife switches may surprise American projectionists, but the more traditional controls at the right, possible for house lights, will not.





THE AUDITORIUM AND PROSCENIUM are impressive, whether observed from down front (top), from the middle of the balcony (middle), or from the extreme left of the balcony front (bottom). In the middle picture, note how the outlet grilles of the air-conditioning have been arranged on the stepped-down portions of the ceiling. This special type of ceiling construction is seen in the design of the outside side wall.





Modern and beautiful throughout, the Metro Theatre, in Valparaiso, Chile's second city and chief port, one of the latest additions to Metro-Goldwyn-Mayer's world-wide chain of showcase theatres, features simple, straightforward design and the finest quality of motion-picture presentation.

The Metro was designed by Arteaga and Larain, one of Chile's foremost architectural firms, under the supervision of the construction department of Loew's, Inc. Contractors were Duhaut and Company.

Lobby and main auditorium decorations were designed and completed by Chilean talent.

The auditorium, whose chairs are of local manufacture, seats 940 on the main floor and 888 in the balcony.

The theatre is air-conditioned by equipment of the Carrier Corporation. The three projectors are Simplex E-7, manufactured by the International Projector Corporation, equipped with Peerless Hy-Candescent arcs, manufactured by the J. E. McAuley Manufacturing Company. Sound is Westrex, manufactured by Western Electric Company and distributed outside the United States by Westrex Corporation. Transverters, manufactured by the Hertner Electric Company, supply the direct current for projection. Installed in the booth also is a special effects machine, manufactured by the Brenkert Light Projection Company.

The theatre will operate as a first-run house.

In Florida, Restaurant Comes to the Cinema in Latin American Style

The Miami Theatre

The new Miami Theatre in Miami is one of the first of the de luxe postwar projects. The task of completing same was truly a great one as work was commenced in March, 1946, before the government's order restricting the construction of commercial buildings. The substitution of materials due to shortages of glass and metal was indeed a task to turn an architect's and owner's hair several shades of gray but in spite of these obstructions a magnificent result has been achieved.

A major complication in planning was a running mate to the difficulties of construction. This was caused by the peculiar dimensions of the property, which was 65 x 230 feet. The fact that it was on Flagler Street, which has the highest front-foot value in the metropolis, precluded the possibility of purchasing any additional width.

The designing architect, S. Charles Lee, solved this and the multitude of other problems in a skillful and ingenious manner. The front has been designed as if the theatre occupied the entire building, giving a mass to the front that is imposing and theatrical. The center motif of the front has the Miami neon sign made an integral part of the building, thereby complying with the strict sign ordinances of the city of Miami. An interesting detail has been worked out in using the letters M, I, A, M, I as single letters free-standing, because these letters read the same from both sides.

The lower floor of the building has a marquee directing the flow of traffic to the entrance without obstructing the adjoining shop which is to be occupied by a restaurant and confectionery. The entrance to the refreshment shop opening from the main street also has an opening into the foyer thereby giving a candy and drink operation both inside the candy store and in the theatre lobby. By an agreeable percentage arrangement this becomes profitable for both operators. Likewise the mezzanine floor is built at a level with the mezzanine level of the theatre and a counter arrangement and glass door arrangement is so fashioned that service to the waiting crowd can be had thruout the mezzanine level, either on a quick service basis or by table service. (For more information on this angle, see pages 518 and 519.) Traffic control has been managed so as to prevent ticket dodging.

The main kitchen is in the basement and dumb-waiter service operates to all levels. There are three restaurant levels, two of which are reached directly by the theatre patrons as explained above.

The architecture of the whole building is modern, softened by baroque touches. Miami being a tropical city, several specially designed tropical fish displays have been built into the architecture, with integrally built-in plumbing arrangements for fresh water, air, and drainage.

By an arrangement of mirrors as part of the architecture a feeling of much wider proportions than the actual footage available for the entrance has been created in the foyer.

A marble and mirror decor starts on the first floor and continues up through the mezzanine level carrying an architectural feeling of height and width into the areas that would otherwise have felt restricted.

A major complication in balcony construction was encountered due to the narrowness of the property. Lee and his supervising associate, Robert Collins, worked this out with the city of Miami in providing balcony exit ramps emptying the lower portion of the balcony directly into the street behind the theatre.

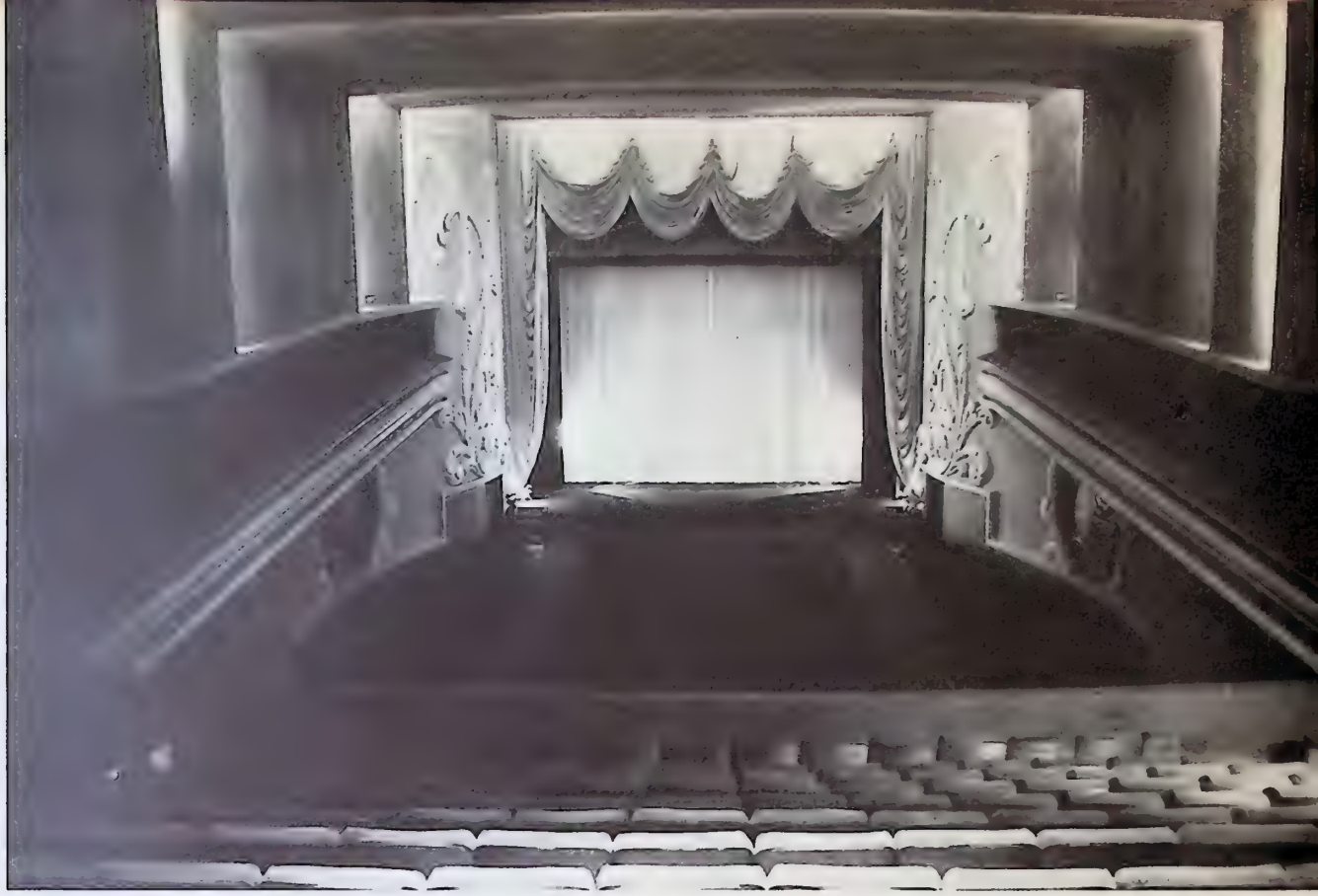
The auditorium seats approximately 2,000 of which about 600 are on the balcony, with de luxe spacing.

Special acoustical treatments have been designed into the theatre due to its extreme length so as to prevent distortions. This acoustical problem was one of major importance as well as the light throw from the projection room, due to the unusual length of the property.

The auditorium is lighted entirely by neon and with an arrangement of coves designed to add width to the general appearance.

THE EXTERIOR of the building, from the marquee down, is Vermont granite. Above the marquee terra cotta was used. The exterior doors are aluminum, bronze, and glass. In the interior Tennessee marble has been used, with the doors covered with Formica to resist kicks and other forms of punishment. The program boards are curved on a 25-foot radius, and employ 10- and 16-inch plastic letters.





SETTING OFF THE STAGE is the contour curtain that, when fully raised, forms the mestooned valance. A traveler is also installed. The screen, at the focal point of a 200-foot throw, will take a 20 x 30-foot picture. The screen and speakers are rigged for flying when the occasion arises.

THE SEATING of the auditorium and the rear balcony utilizes the Kroehler Push-Back chairs, while the front of the balcony (the loge section), a smoking-permitted area, a special American Seating Company chair has been installed. In all, the new Miami will seat 1,860 entertainment seekers.





THE LATIN AMERICAN TOUCH is emphasized by a mural which comes into view when a patron enters the lobby of the theatre (above). In close-up (below) the mural, showing the gaiety and colorful costumes of the various peoples, brings out the theme of friendship among the American nations. F. M. Bergere painted the mural. Included in the painting are rendering of the Pan-American flags.



REFERENCE CREDITS

THE MIAMI THEATRE

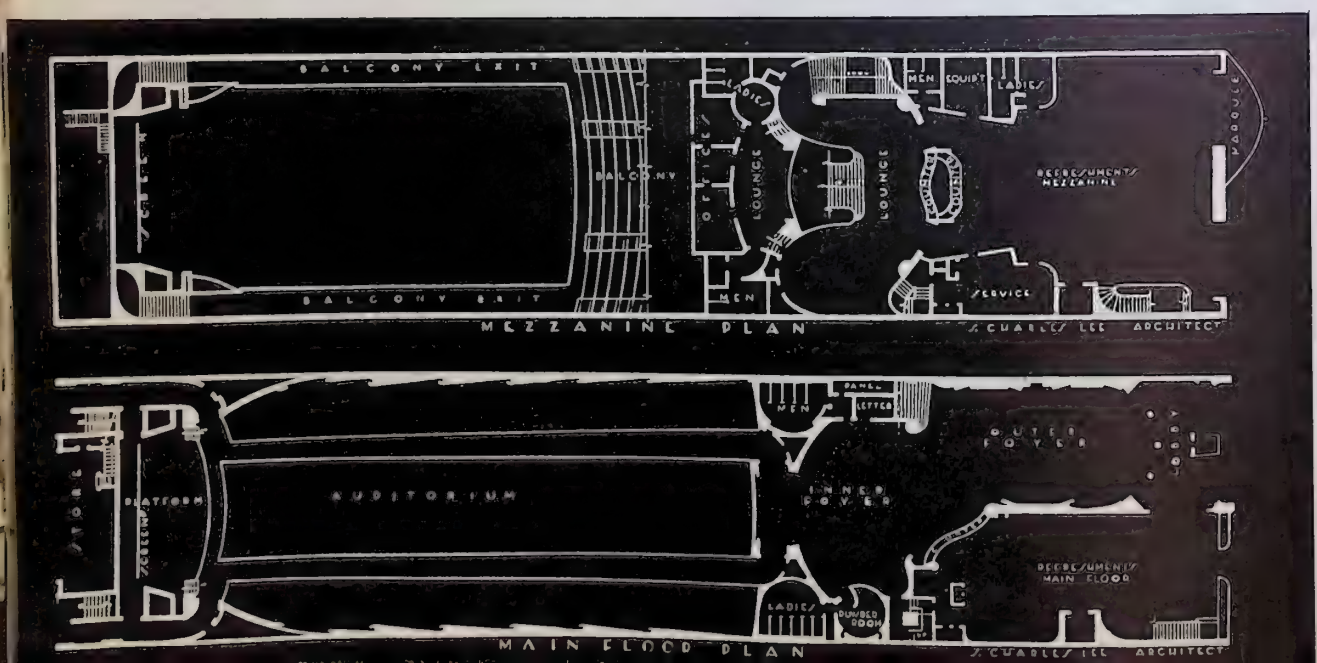
Miami, Florida

OWNER AND OPERATOR: Wometco Theatres.
ARCHITECT: S. Charles Lee; Robert C. Collins, associate.
INTERIOR DECORATOR: Frederick T. Rank.
SEATING CAPACITY: 1,860.

DECORATING AND PAINTING: by Allison Painting Company.
FANS: by Buffalo Forge Company.
HOUSE PHONES: by Central Interphone Company.
MILLWORK: by Dade Millwork and Lumber Company.
STRUCTURAL STEEL: by Dave Steel Company, Inc.
SAFES: by Diebold, Inc.
DRINKING FOUTAIN EQUIPMENT: by Domestic Refrigeration Company.
TERRA COTTA: by Federal Seaboard Terra Cotta Corporation.
HARDWARE: by Frank T. Budge Company.
MOTORS AND STARTERS: by General Electric Supply Corporation.
WATER HEATERS: by General Engineering Company.
AIR DUCTS: by General Sheet Metal Company.
VENTILATING FANS: by Herman Nelson Company.
MARBLE, GRANITE, AND TERRAZZO: by Interstate Marble and Tile Company.
PLUMBING EQUIPMENT AND INSTALLATION: by Markowitz Brothers.
COOLING TOWERS: by Marley Company.
AIR-CONDITIONING CONTROLS: Minneapolis-Honeywell Company.
CARPET INSTALLATION: by Paul's Carpet Company.
STRUCTURAL GLASS, MIRRORS, AND DOORS: Pittsburgh Plate Glass Company.

CARPETS: through Maxwell Company.
CHAIRS: Auditorium and balcony—Push-Back, by Kroehler Manufacturing Company; loge, by American Seating Company.
CURTAIN CONTROLS AND TRACK: through Oklahoma City Scenic Company.
DISPLAY FRAMES: Sealuxe, by Universal Corporation.
LIGHTING FIXTURES: by Graybar Electric Company.
PROJECTION MACHINES: Simplex E-7, by International Projector Corporation.
SIGN AND MARQUEE: Balton-Patrick, Inc.
SIGN LETTERS: Third Dimension, by Adler Silhouette Letter Company.
SOUND: Simplex Four Star (Model A-30), by International Projector Corporation; Voice of the Theatre speakers, by Altec Lansing Corporation.
SUPPLY DEALERS: National Theatre Supply Division of National-Simplex-Bludworth, Inc., and Wil-Kin Theatre Supply Company.
SWITCHBOARD: by Frank Adam Electric Company.
TICKET-ISSUING MACHINE: Automaticket, by General Register Corporation.
UNIFORMS: Evening, by Donald A. Lavigne Company; matinee, by William Rubin.

THE PLANS show the relation of the restaurant and confectionery store to the theatre. The store opens into the theatre lobby, thereby giving theatre patrons access to the services. Likewise the mezzanine floor is built at a level so that theatre customers here may also be served, either on a quick-service basis or by table service. Traffic control has been managed so as to prevent ticket dodging. The main kitchen is in the basement and dumb-waiter service operates to all levels. For further information on restaurant facilities in theatres, he reader is referred o pages 518 and 519.



An Expanded Operation Follows a Fire in Mount Jackson, Virginia

The Nelson Theatre

In the foothills of the Blue Ridge Mountains, not far from Woodstock and Luray, in the heart of Virginia's famed caverns country, lies Mount Jackson, where, last summer, Burgess E. Nelson opened the Nelson Theatre, replacing a 300-seat cinema of the same name which had been destroyed by fire.

The 716-seat theatre, designed by J. R. Mims, is completely fire-proof throughout, with tile walls, long-span joists, steel deck, and a steel suspended ceiling.

The lower part of the front is faced with black Carrara glass which is carried to the top of the building in the space above the theatre entrance. The outer thirds of the upper level are faced with yellow brick. In the central third is also a glass-block area about 8 by 3½ feet. The island box office is finished in black Carrara glass the same as the facade. The outer lobby is covered with a perforated rubber mat in a light green and ivory design.

The lobby and the lounge-room walls are paneled to a height of 5 feet with black Formica above which the finishing material is press-board. Trimming is with stainless steel. The ceilings are plastered.

The auditorium is finished in natural Sabinite, with two-tone red furrow striping. The side walls are each adorned with a large mural, obtained through Novelty Scenic Studios. As an added precaution against possible fire, all stage drapes and curtains are of glass fabrics. (Theatres throughout the country are coming to rely on the inherent fire-proof qualities of spun-glass fabrics more than on treating the usual run of textiles.) Throughout the auditorium and balcony, 20-inch chairs are installed.

As the theatre opened for the entertainment of an estimated white population of 5,000 in the immediate area, the operational policy was to have three changes a week—shows on Sunday, Monday, and Tuesday, on Wednesday and Thursday, and on Friday and Saturay—specializing as far as possible on action drama and comedy. Top price was established as 30 cents for adults and 12 cents for children.

THE NELSON THEATRE, in Mount Jackson, Virginia, replaces, on the same site, an earlier cinema destroyed by fire. The facade of the theatre is faced with black Carrara glass, with trim of ivory, which material in the central portion over the theatre entrance is extended to the top of the building. This central portion, on the second-floor level, is broken by a columnar panel of glass blocks. The other facing material on this level is yellow brick. The island box office is centered below the triangular marquee on which provision is made for two rows of silhouette letters.

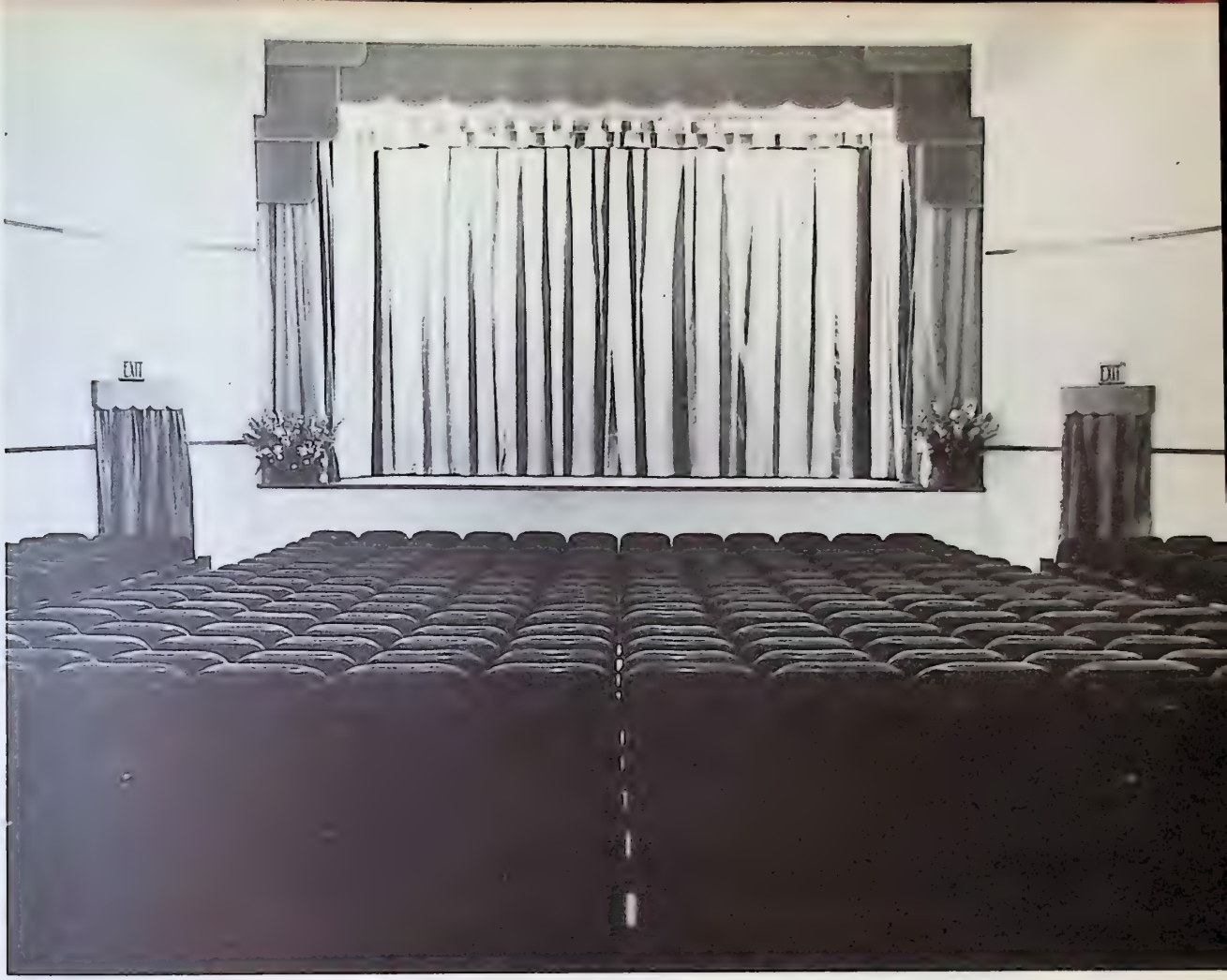


THE LOBBY is, up to a level of 5 feet, trimmed in black Formica, product of the Formica Insulation Company, with the desired trim in stainless steel. The balance of the wall is finished with press-board, and the ceiling is plaster. The special lighting fixtures are by the McFadden Lighting Company. The lounge and toilet rooms (not shown) are finished similarly to the lobby, with two 5-foot mirrors, with 4-inch etched glass on each side. Indirect lighting, in changeable colors, has been placed behind the etched portion of the mirrors for effective illumination and also decoration.

TWO MURALS, one on each side wall, provide the principal decorative effect of the auditorium. The anonymous muralist, showing the influence of Henri Matisse and Grant Wood, did not choose to reflect the natural beauties, caverns, and other attractions of the Shenandoah valley, but rather sought allegorically to represent, through a blending of themes and art styles, as many facets as possible of that sparkling gem, the Never Never land of motion-picture entertainment. Perhaps this treatment is more in keeping with the spirit of the patrons of the American Theatre.







THE AUDITORIUM is finished in natural Sabinite, product of the United States Gypsum Company, with the two furrows decorated in two tones of red. All fabrics are of glass. The front curtain is green with legs of light peach. The sides of the stage setting are of a coral color. The back curtain is a light silver blue. The decoration was planned by the owner and executed by Novelty Scenic Studios.

REFERENCE CREDITS

THE NELSON THEATRE

Mount Jackson, Virginia

OWNER AND OPERATOR: Burgess E. Nelson.
ARCHITECT: J. R. Mims.
DECORATOR: Novelty Scenic Studios.
SEATING CAPACITY: 716.
COST OF THEATRE: $30,000.
COST OF EQUIPMENT (INCLUDING AIR CONDITIONING): $34,000.

ACOUSTICAL MATERIAL: Sabinite, by United States Gypsum Company.
AIR CONDITIONING: by Frick Company, with coils by the Trane Company.
CARPETS: Crestwood, by Alexander Smith and Sons Carpet Company.
CHAIRS: by Ideal Seating Company.
CHANGEOVERS: by Weaver Manufacturing Company.
COIN CHANGER: Coin-O-Meter, by Universal Stamping and Manufacturing Company.
CURTAIN CONTROLS AND TRACK: by Vallen, Inc.
FILM CABINETS: Neumade, by Neumade Products Corporation.
GENERATORS: Transverter, by Hertner Electric Company.
LENSES: Snaplite, by Kollmorgen Optical Corporation.
LIGHTING FIXTURES: McFadden Lighting Company.
PROJECTION LAMPS: Peerless Magnarc, by J. E. McAuley Manufacturing Company.
PROJECTION MACHINES: Simplex E-7, by International Projector Corporation.
REWINDERS: Simplex, by International Projector Corporation.
SCREEN: Walker PM, by Walker American Corporation.
SIGN AND MARQUEE: Artkraft Sign Company.
SIGN LETTERS: Artkraft Sign Company.
SOUND: Simplex Four Star, by International Projector Corporation.
TICKET-ISSUING MACHINE: Automaticket, by General Register Corporation.





Cashiers' Box and Proscenium Absent from Odeon's Toronto House

The Odeon-Fairlawn Theatre

The recently completed 1,200-seat Odeon-Fairlawn Theatre in north Toronto is a community theatre, serving a series of suburban residential areas with 85,000 drawing population.

(The Odeon-Fairlawn Theatre is but one of a string of theatres the J. Arthur Rank Organization plans, and is building, in key Canadian locations.)

The theatre, designed by the late Jay I. English, M.R.A.I.C., and built of steel, concrete, and brick, follows standard practice, but emphasizes fire-safe characteristics.

The effect of an imposing community building has been achieved by the design and by using relatively wide frontage on a heavily-traveled main street location. The effectiveness can be judged by comparing the structure with the adjoining two-story building, which is characteristic of the surrounding shopping-district structures. The effect of modernity is also produced wholly by design, the materials themselves being long-utilized and traditional ones.

Below the broad front of white limestone, the design is carried out in local river stone. The picture window gives passersby a view of the entire foyer. The entrance, in plate glass, is under the marquee. The use of local river stone is in contrast to the broad squares of white limestone and lends distinctiveness to the exterior. The exit door opens into a tiny court, landscaped in miniature with dwarf evergreens.

Two outstanding features are present. The traditional cashiers' cage and sidewalk selling booths have been discarded in favor of a bank-like counter in the lobby, an important patron convenience under Canadian winter conditions. And also, the proscenium has disappeared according with English's ideas in removing the psychological barrier created by the feeling of an audience in one room viewing entertainment in another with a clear dividing line between the two. When the curtains are drawn, they appear to move out across the auditorium proper, and the sharp line of demarcation between audience and screen is, at least, partially eliminated.

NIGHT VIEW of the exterior of the Odeon-Fairlawn Theatre shows how the white limestone facade is also designed to reflect the floodlighting for special events. The picture shows the detail of the visual front at the street level, with glass brick above the exit court at the left. The foyer is completely visible from the street through the picture window (center ground) and the glass entrance doors. In the neon sign, scale and size, rather than animation, have been effectively used to bring the theatre, its name and attractions, to attention of the public, the passersby in particular.





LOOKING TOWARD THE SCREEN from the rear of the auditorium. The entire floor has been carpeted. The color scheme, partially achieved by lighting, is virtually a monotone, done in light green. The proscenium has disappeared. The combined color and line, with running lights on, is to focus the patron's eyes, naturally, on the screen itself without side distractions. The architect, the late Jay I. English, M.R.A.I.C., had been experimenting for some years on removing the psychological barrier of feeling that one is in one room and the entertainment in another.

LOOKING TOWARD THE REAR of the auditorium. Particularly at the rear and above, the way in which inclined surfaces have been introduced as a part of the basic wall design, in order to prevent sound distortion, is clearly visible. Acoustic tile on the rear balcony wall prevents slap-back.



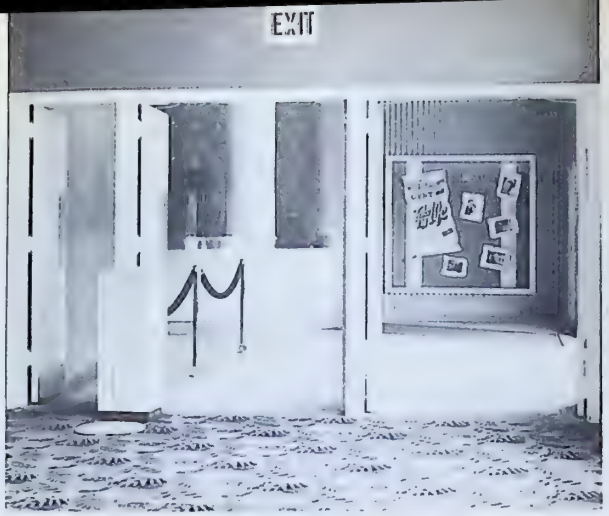


THE BALCONY, like the main floor, is carpeted. Here the back-to-back distance between seats is 36 inches, while downstairs it is 34 inches. As the curtains are drawn, they appear to move out across the auditorium proper, eliminating the line of demarcation between audience and screen.





GENERAL VIEW OF LOBBY. The glass doors at the rear right are parallel to the sidewalk and the heavy pedestrian traffic passes along the entire theatre front. This extends the width of the auditorium with both lobby and foyer in clear view. Ticket-selling counter is shown at the left rear.

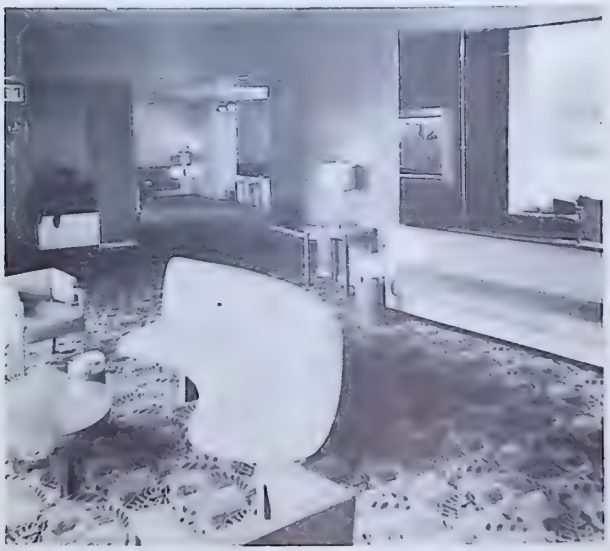


LOOKING FROM THE FOYER into the lobby, the street entrance is at the right. Cashiers work at the curving ticket-selling counter in the far left corner of the lobby. The solid door beyond leads to the manager's office from which a second door gives direct access to the theatre's auditorium.

BUILT-IN FURNITURE of modern design and complementary lamps are extensively used in the foyer and lounge. The effect of the visual front at the street line, with both lobby and foyer completely visible from the street, is continued in the mirror walls that extend right up to the ceiling.



THE FOYER is done in subdued tones, with woodsman green predominating, with complementary colors being picked up in the furnishings. The picture window at the right is part of the visual front. Doors at the rear lead to the lobby, those at the left are used as entrances to the auditorium.



THE ALCOVE LOUNGE is a continuation of the foyer, with entrances to rest rooms at the right and a candy and beverage stand at the left. Lobby, foyer, lounge, and rest rooms are all on the street level. The powder room (not shown) light finishes, in the paneling and furniture, are used.



LOOKING FROM THE LOBBY across the foyer. The window, looking out on the street, forms the left wall. At right is a mirror wall, with entrances to the auditorium on either side. The exit doors (rear left) lead to a small stone court. Beyond is an alcove lounge, rest rooms, and candy bar.



New Sparkler for the Boardwalk at Wildwood, South Jersey Resort

The Strand Theatre

Glass entrance doors were used without the possibility of daylight flashes on the screen, because the entrance is on the end of the standee area, rather than at the usual center.

The booth portholes, barely below the ceiling line, are adjusted by a series of three ceiling steps at either side that are worked into the decoration, lighting, and air-duct plans.

The 22-foot depth of the standee area across the full back of the auditorium, permitting access to all toilet and rest rooms, eliminates the need for a foyer or lounge.

A simple, brightly lighted marquee dominates the block, and a neon-lighted canopy, together with a brightly colored terrazzo pavement trim, carries the theatre's lobby treatment from one end to the other.

As one of the larger summer resorts of the southern New Jersey ocean front, the population of Wildwood during the other three seasons of the year could not possibly support a theatre of the size (1,600 seats) of the Strand Theatre, designed by W. H. Lee for Hunt's Theatres, Inc. Therefore, the entire investment must be supported by its summer operation only, and, as it is located on the boardwalk, the eleven shops are an important adjunct to the financial success of the project.

Designed for maximum income at a minimum cost consistent with modern construction, the theatre has a total volume of only 400,000 cubic feet.

By creating an air chamber in the outside walls as a means of weatherproofing, the decoration on the interior walls was applied directly on the concrete block. A such block has some sound absorption qualities, the acoustical treatment was, therefore, confined to the ceiling and the rear wall.

Another structural economy was the locating of the projection booth over the rear third of the auditorium instead of at the normal rear. The resultant ceiling at the stage was glamourized by the proscenium-draping treatment, while the low ceiling at the rear forms the top of the standee breaker rail.

THE STRAND THEATRE dominates the block, with its brilliantly lighted marquee surmounted by the theatre's name in separate channel letters. Bevelite plastic letters, by Theatre Specialties, Inc., are used on the three-line announcement boards. The soffit, with its neon tubing and incandescent bulbs runs back to the line of the all-glass entrance doors, through which a glimpse may be had of the whole standee space. Eleven stores have been included in the project, located on Wildwood's ocean-paralleling boardwalk, better to ensure the financial success of the commercial venture.





THE LOBBY is dominated by a large display space which, while it probably could hold three different three-sheets, has the display material restricted to less expansive art displays abetted by scene stills. The area is carpeted from wall to wall and is brilliantly illuminated all of the time.



THE INNER DOORS, unlike the outer ones, are solid. The doorman is positioned between the center and right doors, so that he would be in a position to handle the traffic for either or both, although in the less busy periods only the right-hand door would probably be in operation.

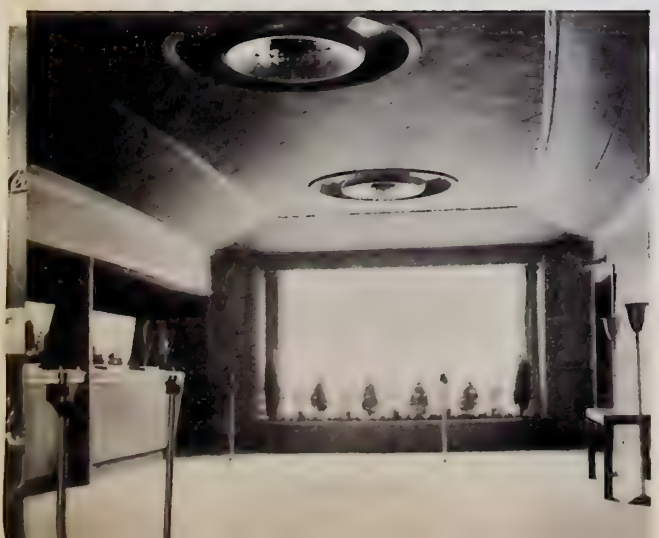


THE CANDY STAND is located in the standee area, on the right just after passing the doorman. An etched mirror, framing the opening of the concession recess, has been designed exactly as that which frames the display boards in the outer lobby. The candy counter is large enough to carry a great variety of items well displayed. Handy storage space is provided for ready access when the need arises.



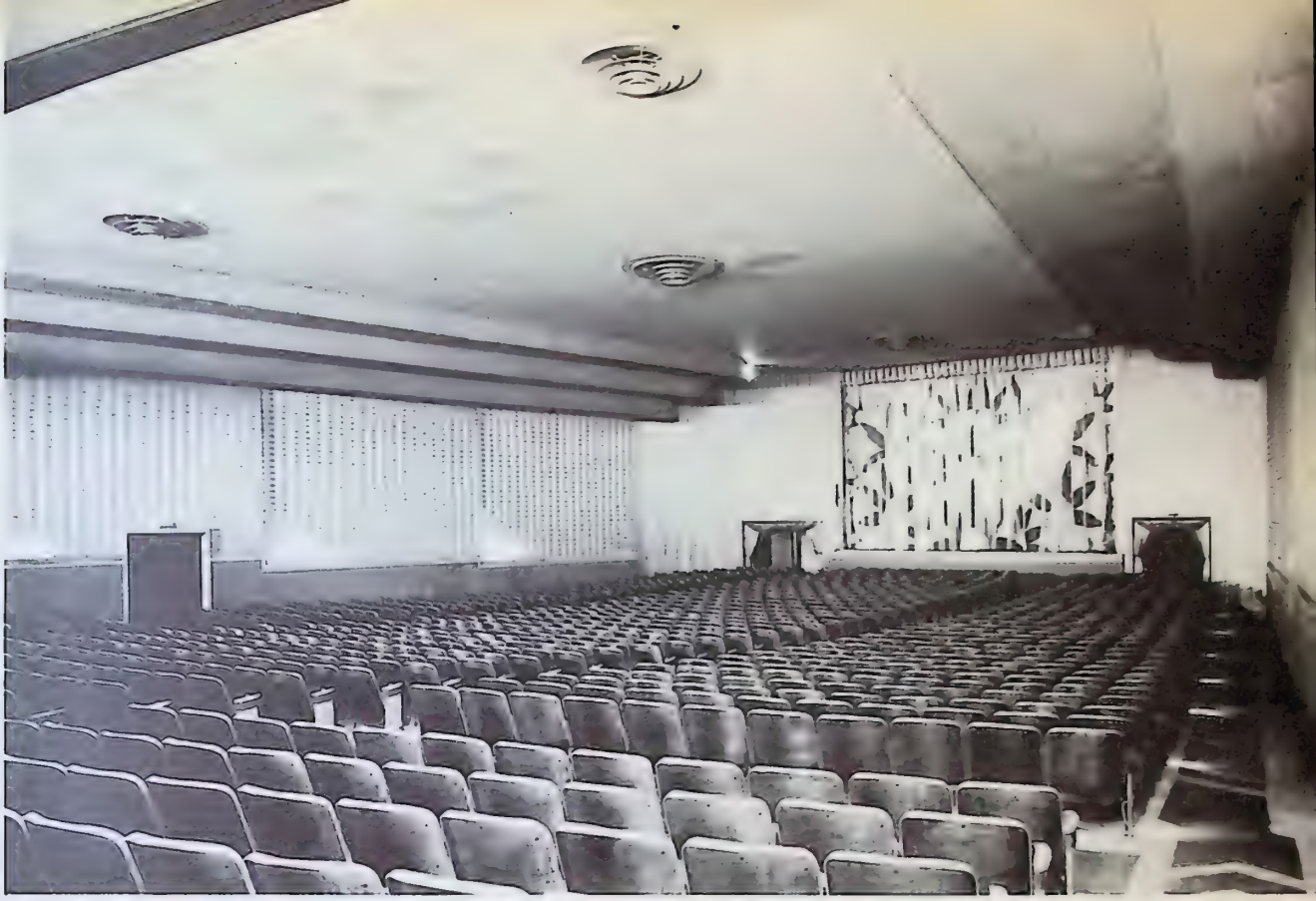
RECESSED DRINKING FOUNTAINS are especially decorated in a motif germane to the shore location of the theatre. Absorbing materials have been used for acoustical property in the ceiling.

A HUGE GLASS-BLOCK WINDOW takes up most of the space across the end of the standee area. A full-width window box, planted with evergreens and other plants, add to the effect. In the afternoon, too much sun light may be prevented from entering the area by closing the curtains.



AT NIGHT, or on especially dull days, a quasi-daylight effect with the glass-block window can be obtained by turning on the three floodlights especially mounted outside the building. The spill from this light source is also utilized in general illumination of the emergency exit areaways.





THE AUDITORIUM, looking toward the stage, shows how the placement of the projection room has resulted in a not-so-high ceiling and also reveals the architectural treatment of the junction of the side walls and ceiling to prevent the auditorium being thought of as much too "dumpy."

LOOKING TOWARD THE REAR, notice the location of the projection and observation ports and how the booth has been constructed so that it is over the rear portion of the seating area. The brilliance of the lighting in the standee area can be toned down when the show is running.



Stores Eliminated in Favor of Conveniences in a Dallas Remodeling

The Sunset Theatre

The Sunset Theatre, located at 1112 Hampton Road in suburban Dallas, Texas, is now, after having changed hands, owned by Charles Brent and is under the management of Talmadge Colb. Brent also operates a theatre in Port Aruthur, Texas.

Using the basic structure of the old theatre, Brent designed the present Sunset Theatre. Twenty feet were added to the rear end of the building and additional height was added to the front to conform to the new design. Space formerly occupied by a beauty shop and another small store was incorporated into the plans and converted into rest rooms on one side of the foyer and the manager's office on the other side.

In the center of the lobby, positioned for easy access to patrons headed for the auditorium proper or the balcony, is a popcorn machine, standing on a specially surfaced portion of the floor. The machine can be operated by the doorman.

In the auditorium the ceiling of acoustical wall board is set from 4 to 8 feet from the roof, allowing space for attic ventilation and taking care of the acoustics. The old seats were removed and new ones installed: 695 in the auditorium proper and 85 in the balcony.

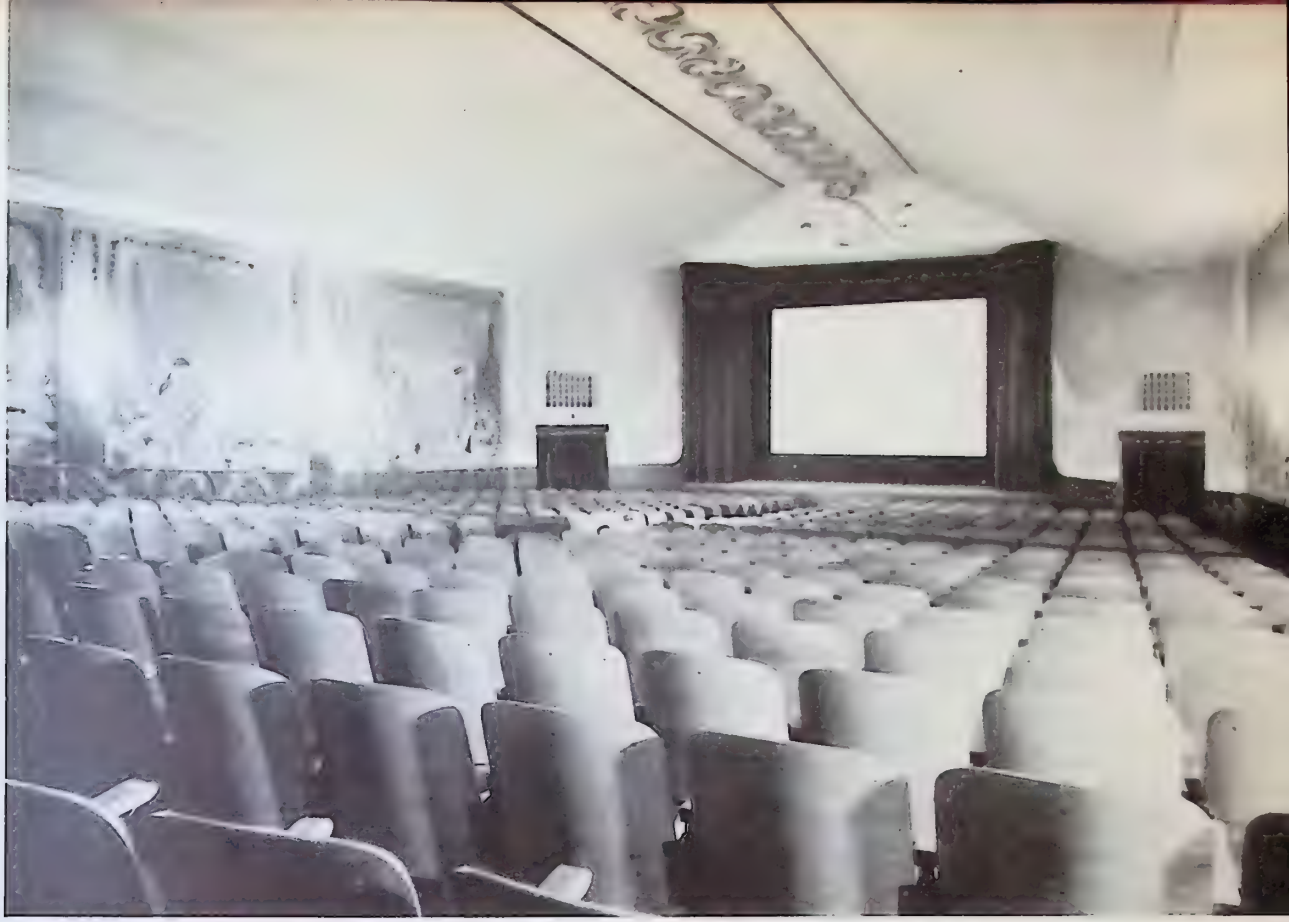
The entire theatre was decorated by R. V. Churchill, formerly of Massachusetts, who employed a floral mural motif through the theatre, especially in the auditorium and the lobby.

The ventilation system is simple and effective. The main part is provided by a blower placed on either side of the screen and placed directly in front of an evaporator set into the rear wall of the theatre. Since the blowers set directly behind the grilled vent to the auditorium, the arrangement eliminates a costly duct system for the equipment. A smaller evaporator and blower and an exhaust fan located in the attic complete the "air-conditioning" system.

The smaller, auxiliary ventilation takes care of the projection room which is notable for its projectors—one a Greene and the other a Brackney, names now forgotten or unknown in a great segment of the cinema world.

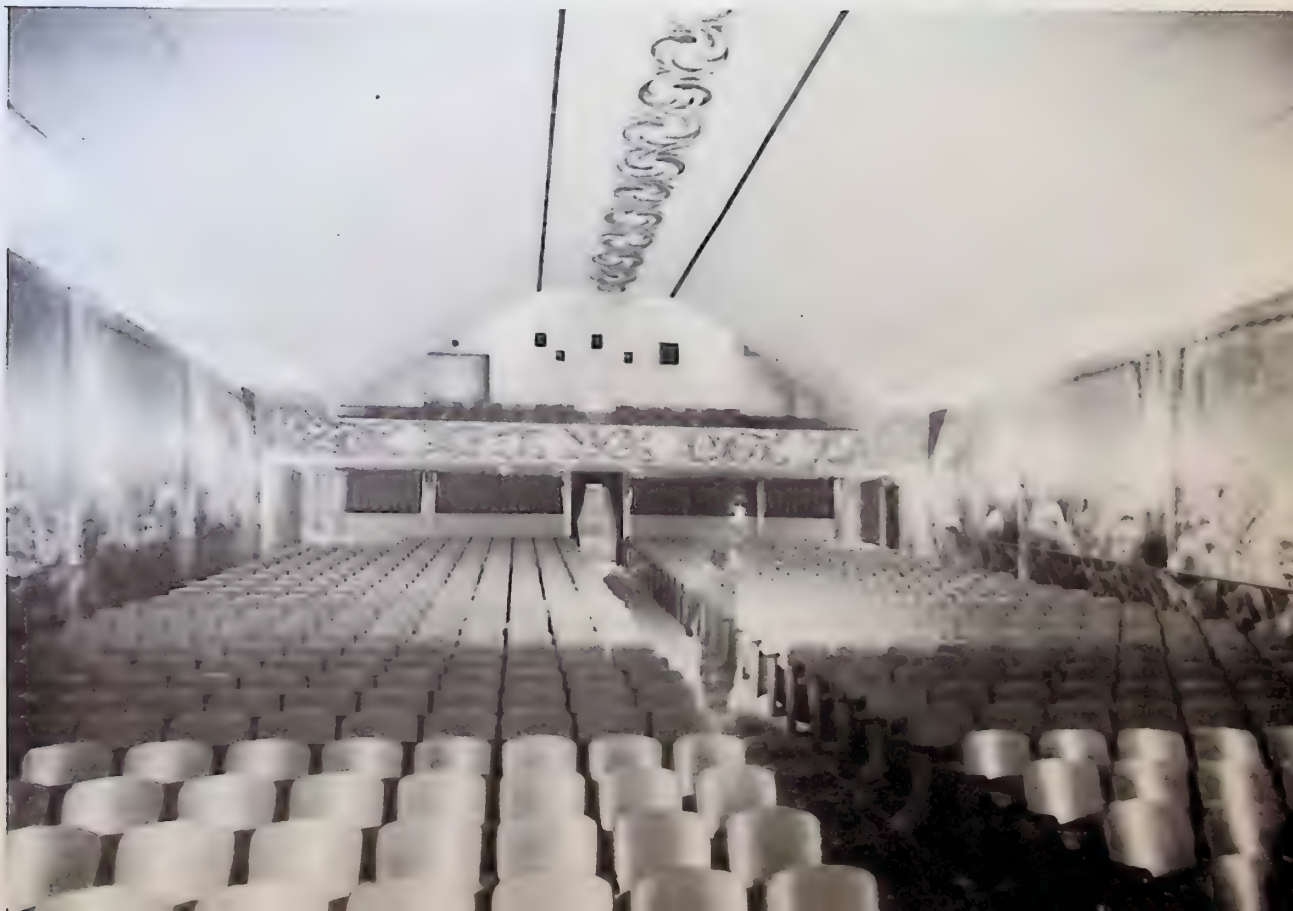
THE SUNSET THEATRE is a remodeled cinema. Using the basic structure of the old theatre, the new one was designed by adding 20 feet to the rear of the structure and an additional height added to the front wall to conform with the new plan. Space on either side of the entrance, formerly occupied by a beauty shop and another store, was incorporated into the plans and converted into rest rooms on one side of the foyer and the manager's office on the other side. The house will seat a total of 780 people, when 695 are in the auditorium and 85 are seated in the balcony.





THE AUDITORIUM, as well as the other portions of the theatre, have been completely redecorated by R. V. Churchill, one-time interior decorator in Massachusetts, now operating in Dallas. The old seats were removed and new opera chairs installed, 695 in the auditorium and 85 in the balcony.

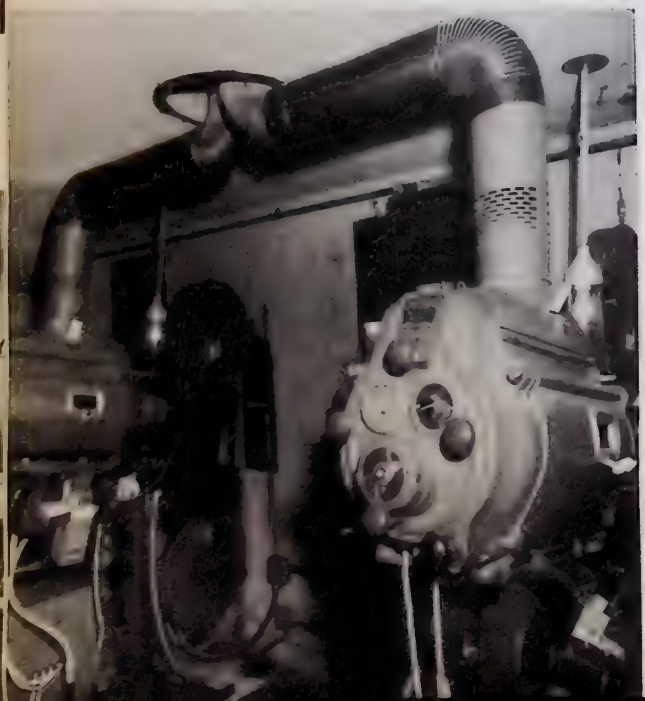
THE CEILING of acoustical wall board is set from 4 to 8 feet from the roof, allowing space for attic ventilation and taking care of the acoustics. The vents above the rear (screen-side) exits, set directly in front of the blowers, furnish the main ventilation and cooling facilities of the theatre.





THE LOBBY of the Sunset Theatre shows popcorn machine right in the center of things! The draped doors in the background lead to ladies' and men's lounges and rest rooms. On the side of the theatre from where this picture was taken (on the stairs leading to the balcony) is located the manager's office, which as the rest rooms opposite, was redesigned from the stores which earlier occupied these areas. Note here, as well as in the previous pictures of the auditorium, the decorative detail of the walls, a type of decor rarely encountered in this extreme form.

IN THE PROJECTION ROOM, ventilation is furnished through a vent in the ceiling, letting air in from the attic fan. How well projection equipment stands up is shown here—one of the machines is a Greene, the other a Brackney—names rarely met with in these days of theatre operation.



THE VENTILATION SYSTEM is simple and efficient. The evaporator is set in the rear wall of the building. Since the blowers set directly in front of the vents on either side of the screen, the arrangement eliminated costly ducts. A smaller evaporator, blower, and exhaust are in the attic.



The Oldest "Legit," the Newest Cinema Face Each Other in Baltimore

The Town Theatre









THE LOBBY (upper left) of the Town Theatre is separated from the outer foyer by three pairs of solid glass doors over which is one of the eight decorative pieces designed by Oscar Bruno Bach, famed art-metal artist. On either side of the entrance are "gardens," which "plant compositions," according to the artist, are intended to express the concept of growth rather than to represent actual plants indigenous to Baltimore.

THE STANDEE AREA (upper right) is entirely carpeted, with a small figured design in which the predominating colors are Caribbean blues and greens, similar to the colors used on the walls. The ceiling and under-portion of the balcony are done in several shades of pink, "from bud-pink through to the mulberries, with perhaps a touch here and there of Dubonnet." Hardly a "standard" color is employed throughout the theatre.

THE LADIES' POWDER ROOM (left) has six make-up tables arranged in a quarter circle, with natural overhead light. The serpentine wall has the same gray-black wallpaper with a huge floral design as used in the mezzanine. The interior fixtures are beige tile and gray marble. Each make-up table has its own compartment. There are two lounges for women and two for men, one of each on each seating level.

MEZZANINE LOUNGE (bottom) had more of the Bach "gardens" in metal, all, however, enhanced by cacti and other growing plants. The mezzanine is shaped with serpentine walls, with the indirect lighting copings following the curvature of the walls. All furniture is made to fit into the natural recesses of the area. Besides the theatre's indirect lighting, there are panels of back-lighted corrugated glass in several spots.





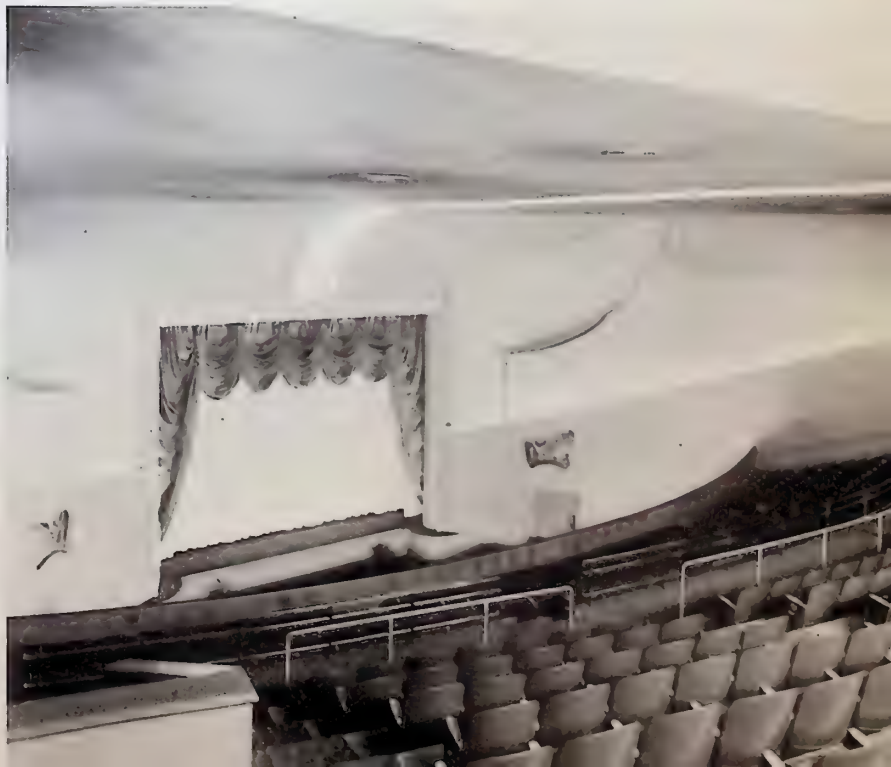
IN THE AUDITORIUM, the shaping of the border lines, and a central path of light running from screen to the back of the house, combine to bring the screen close to the patron. The walls are finished above the shoulder-high dado with acoustical plaster. The screen curtain is a shade of mulberry. A Bach composition is on each wall near the screen, and are symbolic of the industry.

The Town Theatre, latest theatre venture of Isador M. Rappaport, returns to the theatre field what was first built—opopsite the city's oldest house. Ford's—as the Palace, later transmogrified into a garage. The new house, opening early last year, is, from its terra cotta front (see picture on page 87) to the proscenium, an unusual house from an architectural standpoint. The plans of John J. Zink included not only few straight lines, other than vertical ones, but a proscenium treatment seen thus far only in Baltimore's New Theatre (see pages 129 to 144 of the 1946-47 edition) and Toronto's Odeon-Fairlawn Theatre (see pages 78 to 80, this edition).

The latest in projection and sound, air-conditioning and other items of equipment has gone into the house, as well as the newest ideas in art and interior decoration and the blending of color schemes and the creation of an illusion of intimacy. Here one finds serpentine walls, indirect lighting, panels of back-lighted corrugated glass, and modernistic are creations in metal.

In the matter of materials and design, the theatre followed the owner's ideas to make a "different" cinema.

The Town, which Rappaport operates in association with the Hippodrome and Little Theatres, opened as a first-run cinema, operating on a continuous-showing basis, from 10 o'clock in the morning.



Warners' New 1,564-Seat Cinema in Cleveland's Shaker Heights

The Vogue Theatre

A new Warner theatre now provides the citizens of Cleveland's Shaker Heights and surrounding areas with a theatre pleasing to the eye as well as commodious and comfortable to the patrons.

The exterior of the building has been designed in a Neo-Colonial type of architecture, with red brick walls and white trim. The marquee, designed to flow into the building with no sharp breaks, is trimmed with soft rose neon borders. Silhouette letters are used to announce the current attractions. The marquee is designed in a manner so that the announcements can be seen from any angle while prospective patrons are driving or walking by the building. The soffit of the marquee, which extends to the front entrance doors, is studded with lights, as well as being provided with special outlets for spotlights and, around the perimeter, hooks have been installed for the hanging of banners and valances.

Walls of the open front entry are surfaced with structural glass with a marble base. This facing material mirrors the marquee soffit lights resulting in an endless realm of lights. Base of the box office matches the walls of this entry. The box office is equipped with two ticket-selling openings, so that two cashiers may be used when necessary. Floor of this front entry is colored pattern terrazzo. Entrance doors to the lobby, and the doors to the foyer, are covered with Formica.

The entire lobby is carpeted, except for the recessed rubber mat at the entrance. Walls of the lobby are covered with flame-proofed damask in a deep rose pattern. Display frames in the lobby are illuminated with fluorescent lights. General illumination is provided with soft white neon concealed in a dropped center beam which also encloses the air-conditioning duct.

The foyer walls are covered with a flame-proofed damask of gold chevron pattern. The wainscot is covered with bleached walnut. An illuminated mural, in a recessed panel, shows the Burbank, California, studios of Warner Brothers

THE EXTERIOR of the Vogue Theatre has been designed in Neo-Colonial architecture, with red brick walls and white trim. The marquee, designed to flow into the building with no sharp breaks, is trimmed with soft rose neon borders. The three-sided marquee is set so that the four lines of changeable letters on each face can be seen from any angle. The soffit extends to the front entrance doors. Special outlets have been installed for special spotlights, and hooks have been used around the periphery for the hanging of announcement banners and valances when it is desired.





THE AUDITORIUM of the Vogue Theatre contains 1,564 seats on one floor. The walls are covered with a flame-proof damask of a rust-and-gold sunset design. Behind the damask is spun-glass, which serves as thermal as well as sound insulation. Over the ceiling a deep layer of soft rockwool has been blown in. The ceiling has been finished with acoustic plaster. The sound treatments have been technically executed, so that the high-fidelity sound system reproduces the sound exactly as originally recorded at the studios. Proscenium drapes are in copper colors, with a colorful traveler of a leaf pattern design. The auditorium lighting is entirely concealed: no open lighting fixtures are visible to detract or tire the eyes while viewing the picture. Downlights are recessed in the ceiling. Dimmer controls permit daylight lighting of the theatre, and also reducing the intensity down to a level perfect for looking at motion pictures. This type of lighting gives the picture the best and true color value for all pictures and is particularly good for Technicolor and other all-color films. A special section of seats has been equipped with the latest electronic hearing-aid devices for patron convenience.

Pictures, Inc. Lighting throughout the foyer is provided by soft white neon concealed in coves, except for one main ceiling lighting fixture at the entrance. A sweets bar is provided in the foyer.

The foyer lounge contains sectional settees, grouped with tables and lamps to provide an intimate atmosphere.

The ladies' powder room is finished in rich shades of soft rose and pearl gray. The ceiling is treated with special decorative ornament. Cosmetic tables, mirrors, occasional chairs, settee, and torchieres provide complete comfort for milady.

The men's lounge is treated in a masculine manner: asphalt tile floor, decorated walls and ceiling, and furnished with plastic-covered furniture. Colors in this room are rust and green.

The auditorium contains 1,564 seats all on one floor. With no balcony, patrons can view the entire auditorium treatment from any seat. Walls of the auditorium are covered with a flame-proof damask of a rust-and-gold sunset design. Behind the damask is mounted spun-glass insulation which serves not only as sound insulation but also as insulation against cold and heat infiltrations. Over the entire ceiling a deep layer of soft rockwool has been blown in. The ceiling is finished with acoustic plaster. Auditorium lighting is entirely concealed. Dimmer controls permit daylight lighting of the theatre as also reducing the intensity down to insure perfect lighting intensity for looking at motion pictures.

The air-conditioning system is automatically controlled and maintains a uniform temperature regulated to the variations in the outside temperature.





THE LOBBY (looking toward the foyer doors) is carpeted except for recessed rubber mats at the entrance. The walls are covered with flame-proofed damask in a deep rose pattern. Display frames are illuminated by fluorescent lights. General illumination is by neon in the dropped center beam.



THE FOYER is dominated by a 14 x 7-foot photomural of Warner Brothers Pictures' studios in Burbank, California. Whether by accident or design, the candy bar and the mural are each a point of attraction from which the other may benefit. The sweets bar is covered with tufted coral mohair.



THE FOYER LOUNGE contains sectional settees, grouped with tables and lamps to provide a more intimate atmosphere. The men's and ladies' lounges are on either side of this area.

REFERENCE CREDITS

THE VOGUE THEATRE

Cleveland (Shaker Heights), Ohio

OWNER: Samuel T. Haas.
OPERATOR: Warner Brothers Circuit Management Corporation.
ARCHITECT: White and Boenisch.
ASSOCIATE ARCHITECT: Weinberg, Laurie, and Teare.
SEATING CAPACITY: 1,564, on one floor.
COST OF THEATRE (including air conditioning): approximately $380,000.
COST OF EQUIPMENT: $47,000.

GENERAL CONTRACTOR: Shaker Masonry and Concrete Company.
PAVING CONTRACTOR: Highway Construction Company.
DECORATOR: Garbo Decorating Company.
PLUMBING, HEATING, AND AIR-CONDITIONING CONTRACTOR: James J. McHale Company.
ELECTRICAL CONTRACTOR: Doan Electric Company.

AIR CONDITIONING: Automatic control system, with compressors by Frick Company. (Refrigerant: Freon, by Kinetic Chemicals, Inc.)
CARPETS: Crestwood, by Alexander Smith and Sons Carpet Company.
CHAIRS: Mercury Streamliners, by Ideal Seating Company.
CHANGEOVERS: Thide, by Dowser Manufacturing Company.
COIN CHANGER: by Brandt Automatic Cashier Company.
CURTAIN CONTROLS AND TRACK: Automatic Devices Company.
DISPLAY FRAMES: Leiden Cabinet Company.
DRAPERIES AND STAGE CURTAINS: through Novelty Scenic Studios, Inc.
FILM CABINETS: by Neumade Products Corporation.
GENERATORS: by Imperial Electric Company.
HEATING: Steel boiler and stoker, by Brownell Company.
LENSES: Snaplite, by Kollmorgen Optical Corporation.
LIGHTING FIXTURES: by Rambusch.
PROJECTION LAMPS: by C. S. Ashcraft Manufacturing Company.
PROJECTION MACHINES: Simplex, by International Projector Corporation.
REWINDERS: by Golde Manufacturing Company.
RUBBER MATS: by R. C. Musson Company.
SCREEN: Evenlite, by Hurley Screen Company.
SIGN AND MARQUEE: by Brilliant Electric Signs, Inc.
SIGN LETTERS: Wagner Sign Service, Inc.
SOUND: by Radio Corporation of America.
SUPPLY DEALER: Continental Theatre Accessories, Inc.
TICKET-ISSUING MACHINE: Automaticket, by General Register Corporation.
VENDING MACHINES: through Berlo Vending Company.
WALL FABRICS: through Novelty Scenic Studios, Inc.

THE LADIES POWDER ROOM is finished in rich shades of soft rose and pearl gray. The ceiling is treated with a special decorative treatment. Cosmetic tables, mirrors, occasional chairs, settee, and torchieres provide comfort for the complete comfort of the feminine patrons of the house.



THE MEN'S LOUNGE is treated in a definitely masculine manner. Asphalt tile floor, decorated walls and ceiling, and plastic covered furniture are among the items of the room. Colors in the lounge are rust and green. Special ceiling treatment and a floor insert add more interest to the area.



A Cinema in Oklahoma City Remembers the Great Cowboy Actor

The Will Rogers Theatre

The Will Rogers Theatre, owned and operated by Griffith Theatres, was designed by Jack Corgan for the eventual entertainment of some 100,000 residents of the Oklahoma City, Oklahoma, area, and construction on a lot 135 by 135 feet, in association with which a parking lot, 135 by 465 feet, was also laid out.

The theatre that, excluding equipment, cost approximately $150,000, was constructed from brick, steel, and reinforced concrete, with red and buff brick, stucco, and glazed tile as the facing materials, all worked together in a modern design. The facade is dominated by a pylon-like tower bearing the name of the theatre of neonized letters in a porcelain enamel sign. The program boards can be read from both streets at the intersection of which the theatre stands.

The tile lobby, finished in red and peach, leads to the foyer done in pink and brown.

The inner lobby features a mural, done by J. Craig Sheppard in oils on linen canvases, showing the various phases of Will Rogers' career. The scene shows his motion-picture career, as typified by "A Connecticut Yankee," with Rogers shown standing, hands in pockets, wearing a feathered derby and his famous grin, while around him are knights in armor and, at work, are two cameramen and Klieg lights. Pictured, too, is Rogers' ill-fated journey with Wiley Post, with the Alaska map in the background.

A concession stand, with popcorn and candy, is centered in the lobby below the mural.

The suspended ceiling of the auditorium is finished with acoustic plaster done in buff, with sweeping neon-lighted coves. The walls, also finished in acoustic plaster, are done in green, with silhouetts in a cowboy motif done in a darker green.

The theatre has a cryroom and one for smokers.

Air conditioning is provided by two packaged units located in the basement.

THE WILL ROGERS THEATRE presents a striking appearance at night, with light effectively emphasizing the salient facts that here is, indeed, a theatre. As in other theatres recenly designed by Jack Corgan, the emphasis is to make the front—by day or night—strictly theatrical and a positive draw for the population's entertainment nickles, dimes, and quarters. Thus, at night, the Will Rogers resolves itself into a mass of light, with the back-lighted marquee featuring the current attraction and a towering light mass to draw to the theatre those who are afar off.





BY DAY, the Will Rogers Theatre is no less attractive than it is by night. The marquee is eccentric in shape, occasioned by an off-the-corner placement of the box office and entrance and the desirable angle of having the marquee announcement board readable from both streets. It should be noted how the facade of the stores and the theatre have been designed to make a unified architectural whole. While a large parking lot has been provided by the theatre, the city's building line also affords considerable angle parking at the curb in front of the theatre for additional convenience.

REFERENCE CREDITS

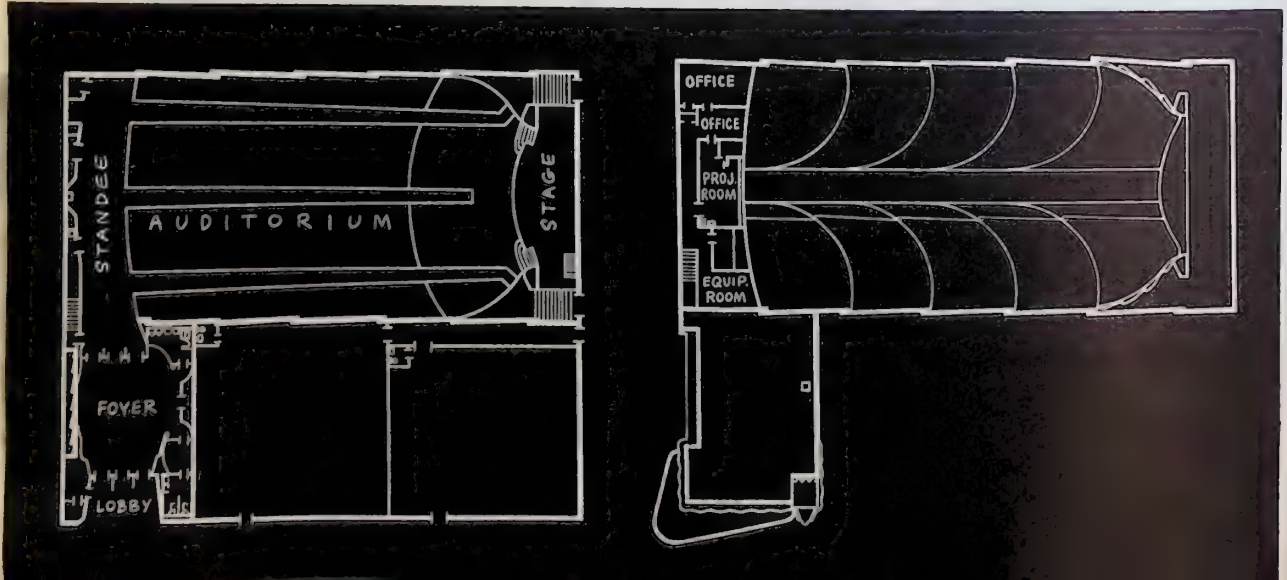
THE WILL ROGERS THEATRE

Oklahoma City, Oklahoma

OWNER AND OPERATOR: Griffith Theatres.
ARCHITECT: Jack Corgan.
DECORATOR: Oakley Murphy.
MURALIST: J. Craig Sheppard.
COST OF BUILDING: $150,000.
COST OF EQUIPMENT: $30,000.

ACOUSTICAL MATERIAL: Sabinite, by United States Gypsum Company.
AIR CONDITIONING: Kooler-Aire (package system), by United States Air Conditioning Corporation.
CARPETS: by Alexander Smith and Sons Carpet Company.
CHAIRS: Bodiform, by American Seating Company.
CHANGEOVERS: Presto, by Dowser Manufacturing Company.
COIN CHANGER: by Johnson Fare Box Company.
CURTAIN CONTROLS AND TRACK: by Vallen, Inc.
DISPLAY FRAMES: Sealuxe, by Universal Corporation.
FILM CABINETS: Neutype, by Neumade Products Company.
GENERATORS: Robin-Imperial, 65/130 amperes, by J. E. Robin, Inc.
LIGHTING FIXTURES: through Meletio Electrical Company.
PROJECTION LAMPS: Enarc, by Brenkert Light Projection Company.
PROJECTION MACHINES: Century, by Century Projector Corporation.
REWINDERS: Neumade, by Neumade Products Company.
SCREEN: Walker PM, by Walker American Corporation.
SIGN AND MARQUEE: Claude Neon Company.
SIGN LETTERS: by Wagner Sign Service, Inc.
SOUND: Simplex Four Star, A-30, by International Projector Corporation.
SUPPLY DEALERS: Oklahoma Theatre Supply Company and National Theatre Supply Division of National-Simplex-Bludworth, Inc.
TICKET REGISTERS: Automaticket, by General Register Corporation.
VENDING EQUIPMENT: Popcorn machine, by Manley, Inc.

THE PLANS for the Will Rogers Theatre (which are presented from somewhat less than the final ones) show how the various parts of the theatre fit together. The first-floor plan (left) shows the lobby, foyer, standee space, auditorium and stage of the 984-seat theatre. The second-floor plan (right) shows, in the auditorium area, the reflected ceiling plan and the curved indirect lighting troughs. Part of the space indicated as offices and that unlabeled space between the equipment and projection rooms, has been changed to provide for the facilities, a cryroom and smokers' room.



THE AUDITORIUM (above) shows what can be done with a minimum of decoration (in the usual sense). The walls and ceilings are faced with acoustic plaster, with the ceiling finished in a buff color and the walls in a light shade of green. Inserted in the suspended ceiling are sweeping curved coves in which are located the neon tubes for the general illumination of the auditorium. The silhouettes on the side walls, all in a cowboy motif, are done in a dark green. The splayed walls also are useful in contributing to the acoustic characteristics of the auditorium.



THE INNER LOBBY (right) is equipped for good returns in the extra-profits aspects of modern exhibition; with a popcorn machine beside the capacious candy counter with its three levels for the display of taste-teasing delicacies. Above the concession area is the mural that depicts various episodes in the life of the great cowboy-comedian-philosopher for whom the theatre has been named. In the portion best seen here, the mural depicts episodes from Rogers' pictures, notably "A Connecticut Yankee," considered to be among the finest of his finest motion pictures.

ANOTHER PORTION of the memorial mural (below) shows more facets of the life and career of Will Rogers, including the days in Claremore, Oklahoma, those as a cadet at the Kemper Military Academy and later as a cowboy in fact, and finally, as many an old theatre-goer still prefers to remember him, as the gum-chewing, rope-twirling star of musical comedy and vaudeville, whose uncanny powers of observation, coupled with a keen wit, enabled him to put forth, under the guise of entertainment, the sound principles of the American way of life



A 950-Seat Cinema Comes to Oklahoma City's Packing Town District

The Agnew Theatre

The Agnew, owned and operated by the Griffith Theatres, was designed as a 950-seat cinema for the population of the packing-town district of Oklahoma City, Oklahoma, with Jack Corgan the architect.

Facing two streets, with the box office at the apex of the intersection, the marquee is constructed so program boards may be read from either street.

The exterior of the theatre is dominated by a tall, pylon-like tower faced with porcelain enamel, with the name of the theatre accented by the use of the five letters as separate units of porcelain enamel multi-lined with neon tubing. The night view of the same elevation shows how the tower is well illuminated with the name of the theatre emblazoned on the front, and all rising from a brilliantly lit marquee and the two program boards, each with its three lines of changeable letters. In design, the tower has been made to appear as rising from the island box office as its base, an aspect especially noticeable in the daytime picture.

The foyer is comparatively plain in decoration, yet attractive through the use of a tessellated arrangement of rubber tile as the floor surfacing and the indirect neon lighting from a serpentine trough around a portion of the perimeter of the area. In a recess, on the right entering the theatre, is the concession area of ample proportions, with a popcorn machine and a large candy counter where three levels of display may be made in addition to whatever may be set out on top of the counter. Supplemental flush-set flood lighting is used over the selling area.

The auditorium, seating some 950 patrons on one floor, is plain but attractive, with advantage being taken of the natural tile effect of the ceiling's acoustical treatment. General illumination is provided by a series of downlights above the line of the two aisles and by neon cove lighting set into the screen side of the wall splays created to the betterment of the acoustic characteristic of the room. The proscenium area is simple but effectively draped and curtained.

THE AGNEW THEATRE, a suburban house in the packing-town area of Oklahoma City, Oklahoma, was designed by Jack Corgan for Griffith Theatres. The exterior is dominated by a tall, pylon-like tower of porcelain enamel, with the name of the theatre accented by the porcelain enamel letters, multi-lines with neon tubing, mounted on the tower. The night view (on page 97) shows the tower well illuminated, with the name of the theatre emblazoned on the front. The island box office, centered below the triangular marquee, seems to be the base of the tower.





THE AUDITORIUM of the 950-seat Agnew Theatre cares for its audience on a single floor. General illumination of the auditorium comes from downlights, set flush in the ceiling, and from vertical coves set in the splays in the side walls provided to better the acoustical characteristic of the room. The aisles are carpeted, but only in the central half of the pathway. The ceiling decoration is nil, other than that afforded by the nature of the acoustic material applied. The walls are plain, except for a pseudo Indian-feather leaf-effect to take away any possible effect of bareness.

THE FOYER is comparatively plain, with a nice concession area—replete with a popcorn machine and a spacious candy counter—and, along the opposite wall, comfortable, modern lobby furniture. The floor is covered with rubber tile. The general lighting comes from neon tubes inserted in a serpentine cove around most of the area. Additional downlighting is applied over the entire concession area.



THE NIGHT VIEW of the front (compare with the picture on page 96) emphasizes how very potent an attraction light can be when it is used as an element of the entire decorative planning.



A Monumental 3,200-Seat Theatre Opens in San Luis Potosi, Mexico

El Cine Avenida

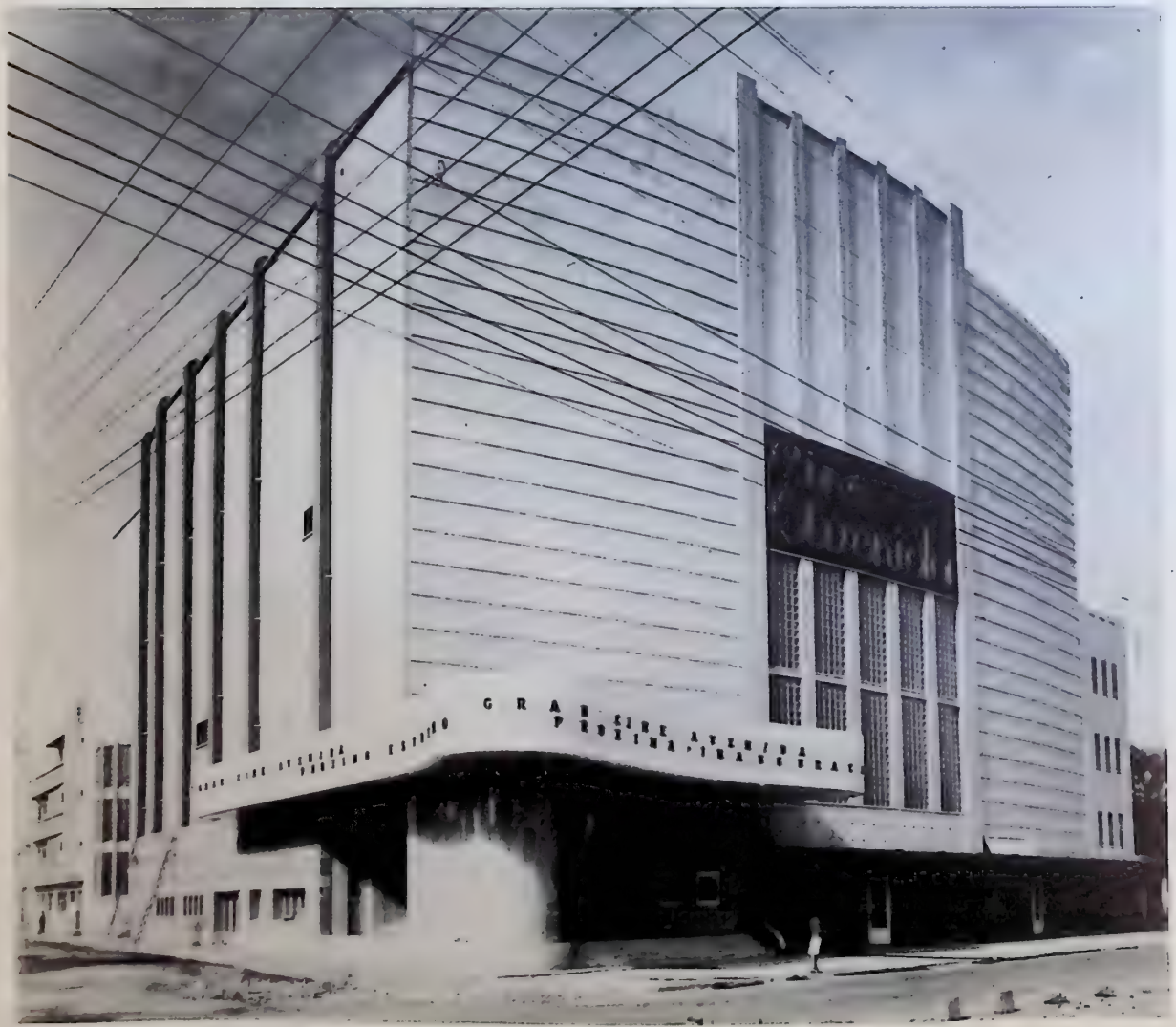
El Cine Avenida (Avenue Theatre), designed by Javier Vilchis Pliego, architect, for Jose Vilet, Jr., is a 3,200-seat theatre that definitely monumentalizes motion-picture exhibition in San Luis Potosi, capital of the Mexican state of the same name, some 220 miles northwest of the national capital.

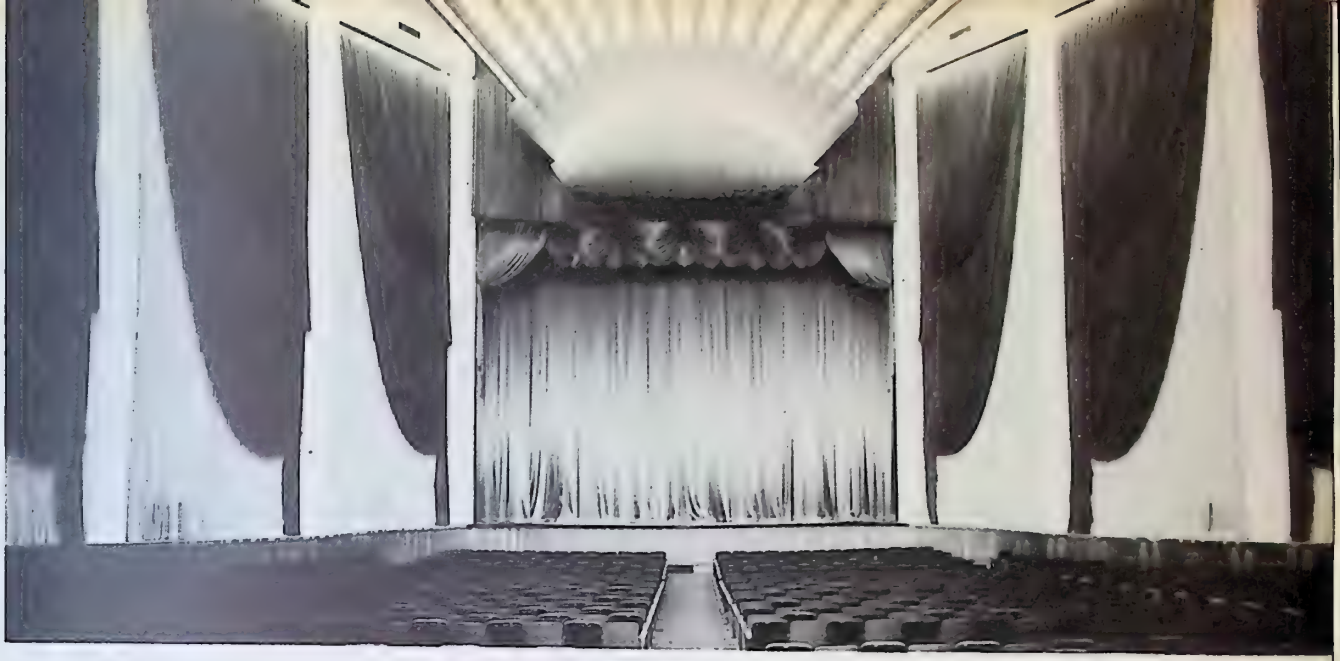
Complete details are not available on this theatre, which opened to the public on October 10, 1947, but in the four pictures provided through the courtesy of Salvador Gonzales, manager of F. Mier y Hermano, S.A., of Mexico, D.F., ample evidence of theatrical magnificence is presented.

From the gleaming white exterior to the luxuriously draped auditorium, and through all the public areas, the Cine Avenida is one to which the industry on both sides of the Rio Grande may point with pride.

As to equipment, it is assumed that it is from the lines for which F. Mier y Hermano have exclusive distribution rights in Mexico, which lines include Simplex projectors; RCA sound; Peerless Magnarc, Simplex, Strong, and Hall and Connolly projection lamps; Bausch and Lomb lenses; Walker sound screens; Transverter and Stabilarc motor-generators; Strong, National, and Acme rectifiers; Vallen curtain controls and track; and National and Columbia carbons; and other items of such companies as International Projector Corporation, National Theatre Supply, Rocke International Electric Company, and the Automatic devices Company.

EL CINE AVENIDA (Avenue Theatre), in the city and state of San Luis Potosi, Mexico, is an imposing structure in gleaming white stone, fittingly monumental for a state capital. While not enirely finished when the picture was taken, the shape of the marquee and the four tall and comparatively narrow glass-block windows, not to mention the entire architectural aspect, set the house apart from its comparable American theatres. The Cine Avenida was designed by Javier Vilchis Pliego, architect, for the owner, Jose Vilet, Jr. The theatre was opened on October 10, 1947.





THE AUDITORIUM (above) is a striking departure from the regular run of American theatre, by virtue of the decorative scheme based predominantly on the use of drapes and hangings not only for the proscenium, but for the side walls as well. Lack of data prevents a full description of the color scheme, but even in Black and white the effect is sumptuousness. Note, too, the use of dark colored backs on every other chair with the padding the other color.



THE LADIES' LOUNGE (right) is plainly decorated, but comfortably furnished, with well padded lounge chairs and, for milady's make-up, kidney tables each with mirror of ample proportions. A large mirror, extending from floor to ceiling, serves not only as a device to make the room seem just so much larger, but also—and, perhaps, more so—as a full-length mirror for the final checking of ensembles before leaving the theatre. The carpet is wall to wall.

THE PROMENADE (below), on an assumption based on the outside view, occupies the area above the foyer. Besides brilliant cove lighting, the area is also illuminated through glass-block windows during the daytime hours. The gentle rise of the staircase, no less than the expansiveness of the promenade, is further eloquent testimony of the appreciation of magnificence and comfort found so frequently in Latin American theatres but often lacking in the U. S. theatres.



Glass-Walled, Visual Lobby a Cinema in Westmount, Quebec

The Avenue Theatre

The Avenue Theatre, on Greene Avenue, in Westmount, Quebec, owned and operated by the United Management Corporation, Ltd., was designed by the architectural firm of Luke, Little, and Mace.

Of fire-proof construction, the 850-seat theatre ot the stadium type is erected from rinforced concrete and steel, with facing materials of brick and polished granite on the walls. Cost of the project was approximately $195,000, including $35,000 for equipment and air-conditioning.

The front features a visual lobby, with full-view glass walls on the outside. A marquee covers the sidewalk, coextensively with the glass walls. Only the theatre name, in stand-up script type, neon-lined letters, is used for the outside advertising. According program announcements are made by posters in several easel frames in the lobby which can be read by passersby. The front is faced with pink-buff brick, polished red granite, and Alumilite.

The foyer-lounge is floored in slate flagstone, with the walls paneled in prima vera plywood with marble trim. Large room-type carpets add a touch of hominess to the area. Ceiling is red-flocked.

The auditorium provides for a standee area between the last row of seats and the stadium rise. The walls and ceilings are done in shades of red to buff, with a turquoise blue panel over the proscenium. The walls (that are 12 inches thick: 8 inches of concrete block and 4 inches of facing brick) are overlaid with a metal furring which on the screen edge splays out to a distance of 12 inches. Into the cove formed by the splays have been placed lighting fixutres for the general illumination of the auditorium. The side walls are plastered over the furring, while the real wall has been treated with Acousti-Celotex.

The men's and ladies' toilet rooms have tile floors, with 7-foot dados. In the powder room, three vanity shelves have been provided.

Other features of the theatre include a vault built-in as part of the manager's office; built-in telephone facilities; checking service; candy counter; and a private viewing room.

The theatre, located in a neighborhood shopping district will draw from an estimated 35,000 population, mainly of English-speaking Canadians. As the theatre opened, it was the policy to operate as a first-run, showing the best of the English pictures, with, perhaps, from time to time, supplementing the program with the better Hollywood productions.

THE AVENUE THEATRE, on Greene Avenue, in Westmount, Quebec, is an example of a cinema that is all-theatre, yet, by the usual design and architectural standards of the United States, quite untheatrical. The lobby is entirely glassed in on the two out sides, making the whole area perfectly visible to the passersby. Coextensive with the glass walls is a marquee, surmounted, as to be read from two directions, two name signs done in neon-lined script letters. Materials used on the exterior of the theatre include such items as pink-buff brick, red granite, and Alumilite.



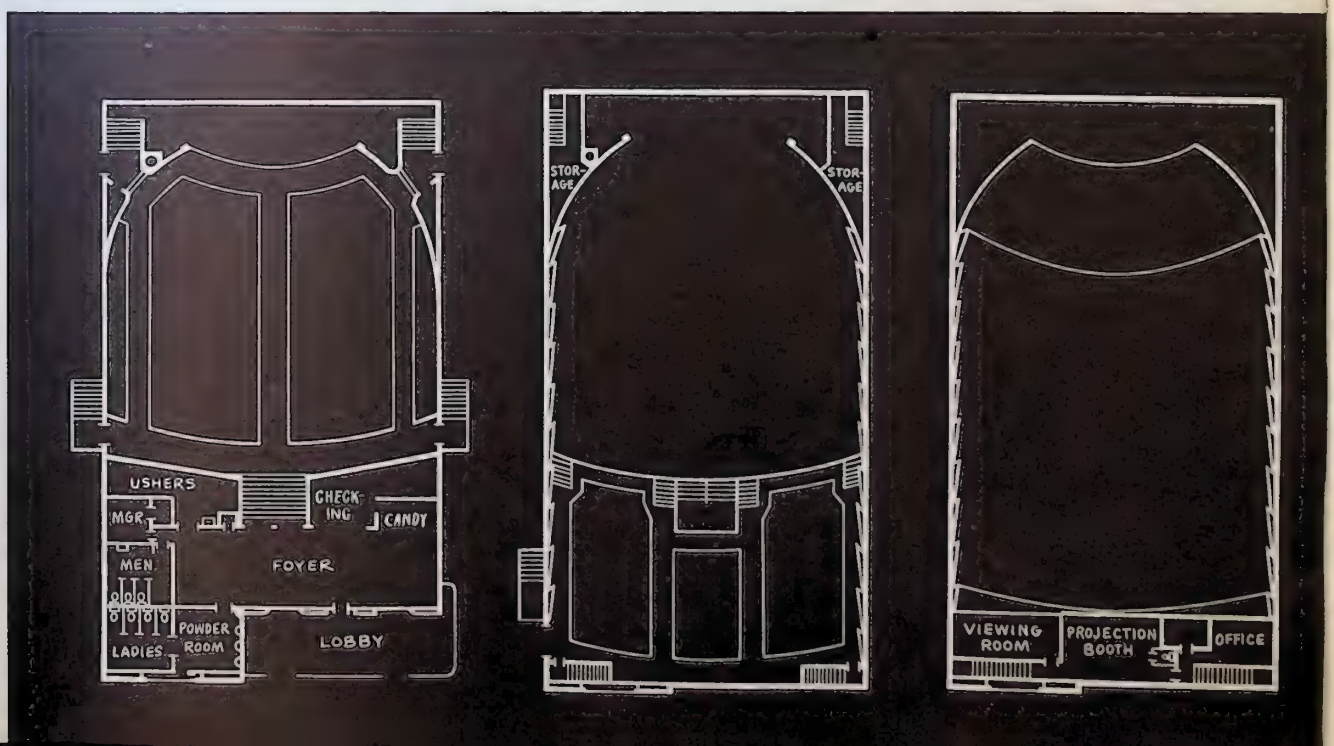


THE AUDITORIUM of the Avenue Theatre, seen from the rear of the stadium section (above), shows the splaying of the walls and the light coves which are done in shades of red to buff. A turquoise panel stretches over the top of the stage. The acoustical material is Celotex, and other items of equipment include carpets, by T. Eaton Company; chairs (of the slide-back type), by the Canadian Chair Company; curtain controls and track, by D. C. Orrock and Company.



THE FOYER-LOUNGE (right) is adorned with prima vera plywood paneling, with a red-flocked ceiling. (In the lobby, with painted plaster walls, is a modeled frieze depicting episodes of Canadian history.) Here, heavy upholstered club chairs are provided, as well as (center background) checking facilities and two-display-case candy counter. A wide, full-length mirror at the area's extreme right adds to the effect of spaciousness of the arcade and additional patron service.

THE PLANS of the Avenue Theatre—as drawn by the architectural firm of Luke, Little, and Mace—show the three operational levels of the theatre: ground floor, stadium section, and projection room floor. While the manager's office is on the first floor, supplemental office space is provided beside the projection room, on the other side of which has been placed a private viewing room. The air conditioning is done by the local D and D Air Conditioning Company.



An 875-Seat Cinema Is Built Near the University of Oklahoma Campus

The Boomer Theatre



THE BOOMER THEATRE, located in Norman, Oklahoma, just off the campus of the University of Oklahoma, is comparatively plain in the daylight view (above) and brilliantly illuminated by night (below). The front is of stucco, illuminated with neon, with the sign and marquee done in red and white, the university's colors. The theatre is owned and operated by Griffith Theatre of Oklahoma City.

The Boomer Theatre is owned and operated by Griffith Theatres, of Oklahoma City, and is located in Norman, just off the campus of the University of Oklahoma. Jack Corgan was the architect.

The theatre is comparatively plain, although highly decorative in the front part of the theatre. The front itself is faced with stucco, illuminated with neon and a sign and marquee decorated in red and white, the colors of the University of Oklahoma.

The foyer is very nice and colorful, with the walls above the head line covered with a washable cloth in a striking design in tones of peach, blue, and white. Over the doors leading into the standee area at the rear of the auditorium is a large mural recalling the days when the settlers arrived by ox-drawn covered wagons.

The auditorium seats 875 people on one floor, although there has been provided on the projection-room level a special viewing room, seating 35, which is used for special parties and other groups. The auditorium is plainly decorated, with the general illumination coming from a cove running the full length of the space on both sides of the ceiling. A stylized leaf pattern is used on various sections of the side walls to remove the drabness that might otherwise obtain.





THE AUDITORIUM of the Boomer Theatre (above) seats 875 on one floor. On the second floor, however, is a 35-seat viewing room available for special parties and other groups who might want to use it. The interior is compartively simple, merely decorated to eliminate any possible drabness.

THE FOYER (below) is very nice and colorful, with the space above the auditorium entrance doors adorned with a mural depicting the Oklahoma settlers. The walls above the head line are covered with washable cloth in a striking peach, blue, and white design. The area is entirely carpeted.



The Eastern Shore of Maryland Gets Its First Air-Conditioned Cinema

The Boulevard Theatre

The Boulevard Theatre, largest and most modern theatre—and the first to be air-conditioned—on Maryland's Eastern Shore, was designed by Raymond Todd and Newell Howard for the Ulman Theatre Corporation.

The 1,105-seat theatre incorporates wartime and post-war developments in acoustics, decorative materials, lighting, and air-conditioning.

Entrance to the Boulevard Theatre is unusual in that there are two box offices, in glass brick, at either side of the entrance, separated by a wide panel of glass doors. In the lobby large mirrors help to create an illusion of bigness.

The two box offices are unusual, but the idea offers many advantages from a managerial standpoint.

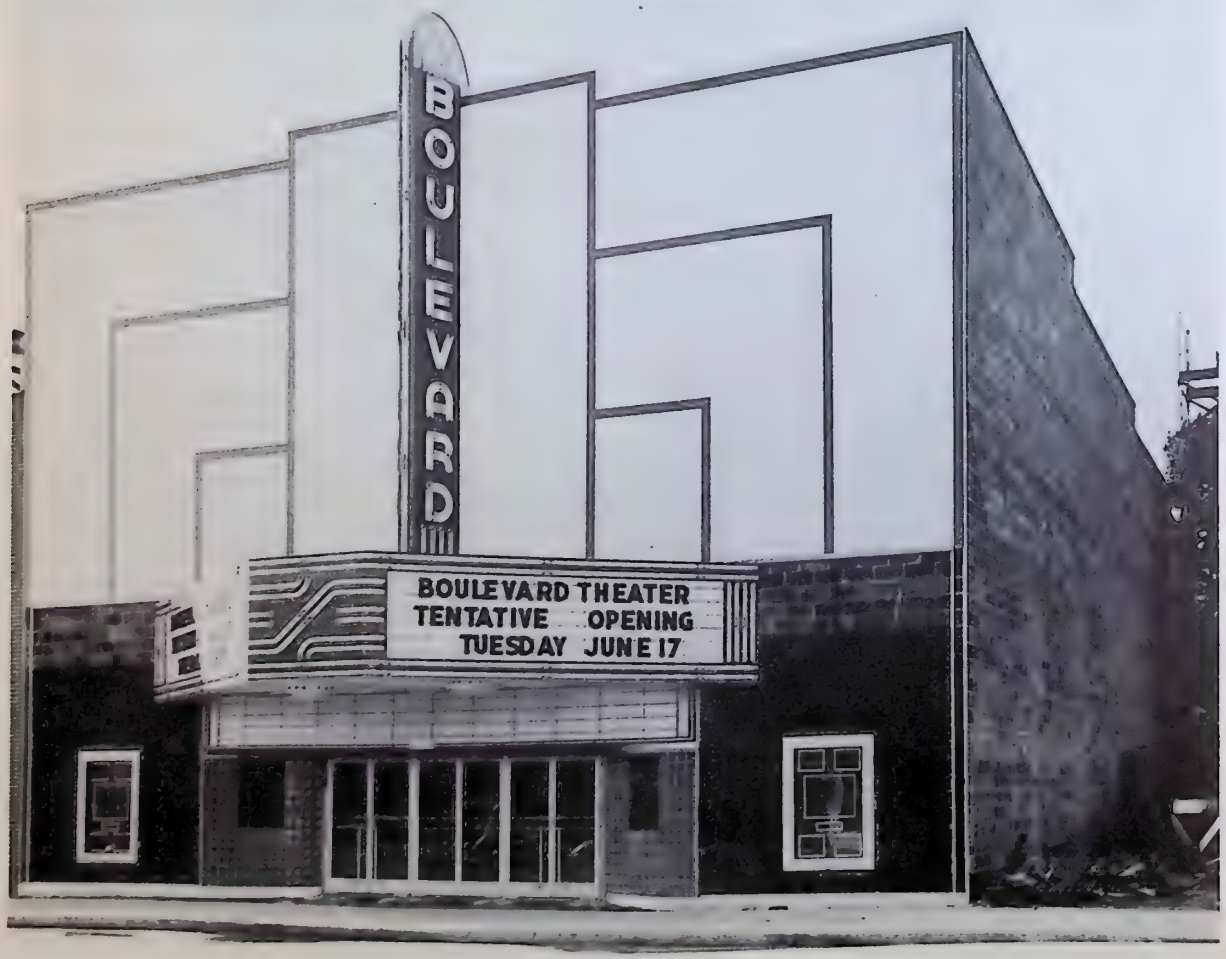
The ceiling of the auditorium is of acoustic tile, with concealed lighting channels in the secondary ceiling around the walls. Four colors of lights in the channels cast pre-determined reflections and color over the theatre, the light pattern being controlled by a motor-driven switch system. Stage lighting is controlled by the same system. The walls are draped in subdued spun glass cloth, indirectly lighted. Wall wings bring the walls in toward the stage in illuminated, curved sections. Aisle carpeting is a plain design in dawn gray.

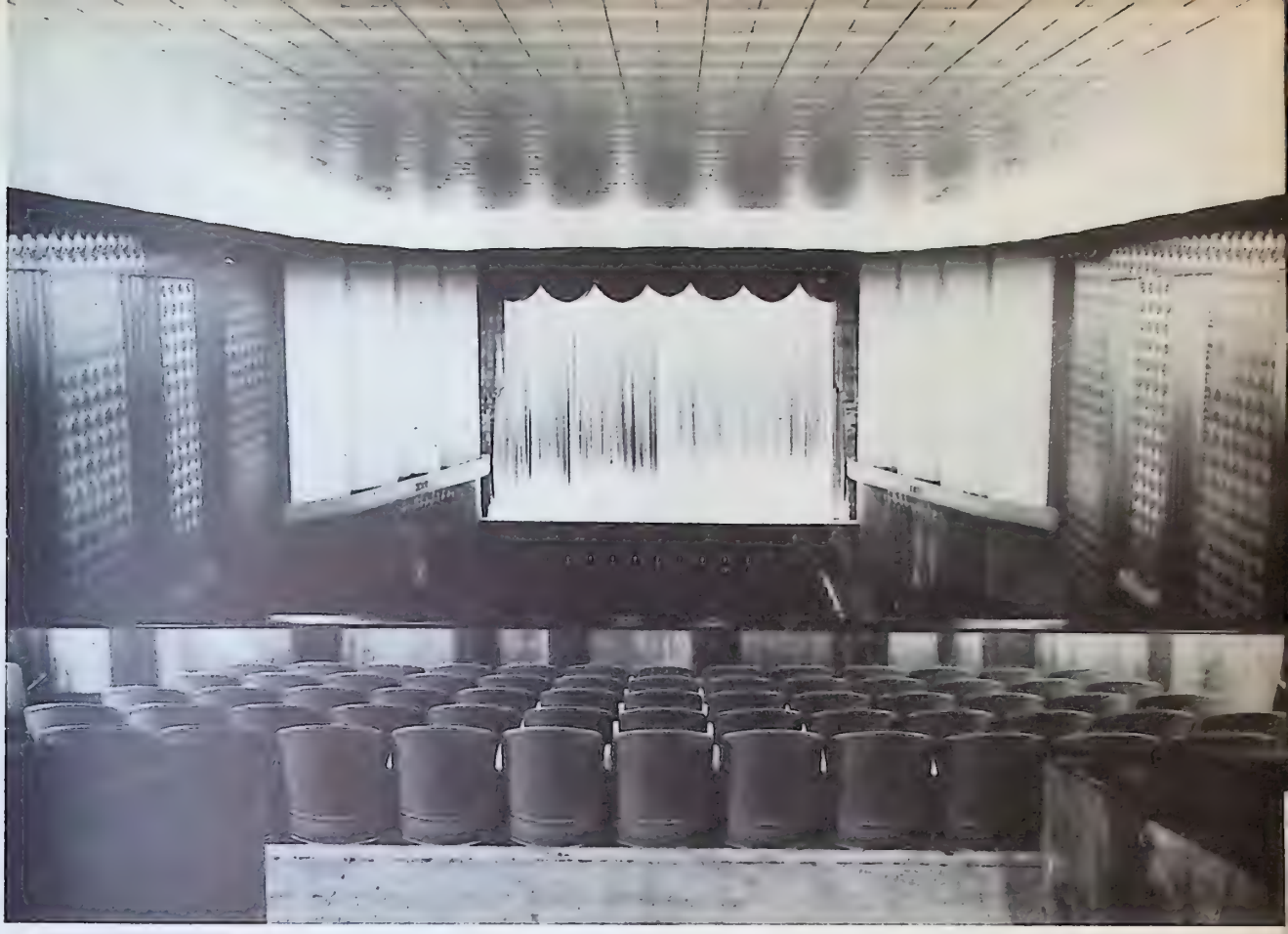
Unusual features of the theatre are the nursery and party booths in the balcony. The 8-seat nursery is soundproofed and has separate sound equipment so that a picture may be seen and heard from the room. Across the balcony from the nursery is the 21-seat party booth for private theatre parties.

The mezzanine lounge is reached by wide open staircases in natural wood at each side of the lobby. A bright futuristic mural is the center of interest in the lounge decorations. Drinking fountains and rest rooms are located off the lounge. Access to the balcony is by a wide center stairway.

As the theatre started to operate last summer, it was the anticipated policy to operate as a first-run, with one to two pictures from the major companies each week.

THE BOULEVARD THEATRE, photographed somewhat short of completion, shows the unusual use of two box offices, one on either side of the three pairs of entrance doors, and both entirely framed by glass block. The upper portion of the facade is faced with white stucco, applied over cinder block, and black-striped for decorative effect. The marquee provides on each of its slanted sides space for three lines of changeable letters. The upright sign has the nine letters of the theatre name formed by four closely set lines of neon tubing, with neon also forming the decorations.





THE AUDITORIUM has the ceiling finished with acoustic tile, with concealed lighting in channels around the walls. Four colors of lights, each on its own dimmer-controlled circuit, is used. The walls are draped with subdued spun glass cloth, indirectly lighted. Wall wings bring the walls in toward the stage in illuminated, curved sections. The main color scheme is Colonial blue and pink. The aisle carpeting is a plain design in dawn gray. Throughout the theatre, modern materials have been generously used, as well as a considerable amount of matched veneers on the walls.

REFERENCE CREDITS

THE BOULEVARD THEATRE

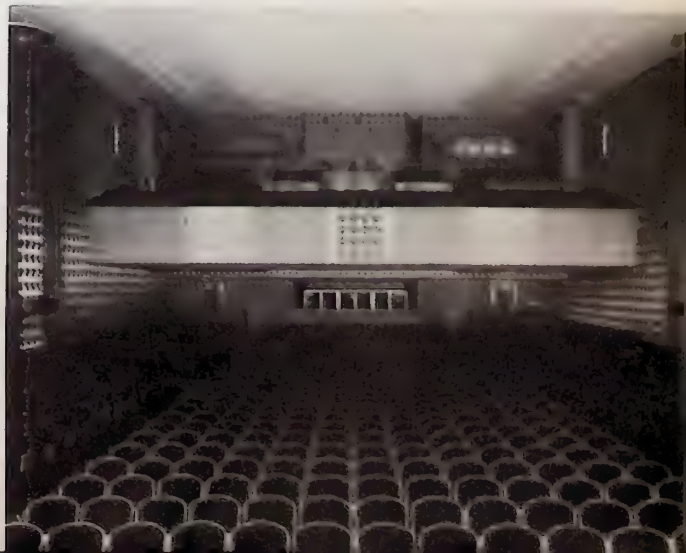
Salisbury, Maryland

OWNER: Furman Richardson and "Natty" Wooten.
OPERATOR: Ulman Theatre Corporation.
ARCHITECTS: Raymond Todd and Newell Howard.
DECORATOR: McCarthy Decorating Company.
SEATING CAPACITY: 1,100.
COST OF BUILDING: $220,000.
COST OF EQUIPMENT (including air conditioning): $58,000.

AIR CONDITIONING: Refrigeration system, by United States Air Conditioning Corporation, installed by Elmer Brient and Sons.
CHAIRS: by Heywood-Wakefield Company.
CHANGEOVERS: Strong Zipper, by Essannay Electric Manufacturing Company.
COIN CHANGER: by Johnson Fare Box Company.
CURTAIN CONTROLS AND TRACK: by Automatic Devices Company.
DRAPERIES AND STAGE CURTAINS: by Knoxville Scenic Studios.
FILM CABINETS: Neumade, by Neumade Products Corporation.
GENERATORS: by Hertner Electric Company.
LENSES: Super-Lite, by Projection Optics Company, Inc.
PROJECTION LAMPS: by Brenkert Light Projection Company.
PROJECTION MACHINES: by Motiograph, Inc.
RECTIFIERS: by Garver Electric Company.
REWINDERS: by Goldberg Brothers.
RUBBER MATS: by Perfo Mat and Rubber Company.
SCREEN: by Radio Corporation of America.
SIGN AND MARQUEE: by National Sign Company.
SIGN LETTERS: by Wagner Sign Service, Inc.
SOUND: by Radio Corporation of America.
SUPPLY DEALER: Elmer H. Brient and Sons.
TICKET-ISSUING MACHINE: Automaticket, by General Register Corporation.

IN THE BALCONY (right) have been included a nursery and a party room. The nursery, seating eight, is sound-proofed, with its separate sound equipment. The party room (below), with seats for 21, uses wall fabrics of spun glass. Use of the room is had through special, and advance, arrangement.





A $125,000 Cinema Is Built in the Belmont Section of Dayton, Ohio

The Dabel Theatre

The new Dabel Theatre serves an industrial section, Belmont, in Dayton, Ohio, populated mostly by skilled workers of the city's many manufacturing plants. The Dabel, owned and operated by Maurice White and Nick Shafer, was designed by the F and Y Building Service.

The size of the lot is 98 by 200 feet, with the large frontage on the main street, Smithville Road, and represents six lots. Due to restrictions of the local zoning board—which involves a 15-foot setback from the front line and a 10-foot setback from the rear lot line, as well as other restrictions—the size of the theatre has been limited to 72 by 180 feet.

The front elevation of the $125,000 Dabel Theatre combines green-veined white Georgia marble facing, trimmed with cream-colored terra cotta. The left side of the front elevation represents a marble shaft, or tower, capped with multi-colored terra cotta moldings which wrap around the top of the tower and then travel down the tower's side to the ground. The tower to the left of the front elevation is ornamented by stylized channel letters which spell out the name of the theatre. The remainder of the front elevation is of formal modern classic design, completed in buff face brick.

Below the marquee, triangular with program boards to accommodate four lines of Wagner Sign Service changeable letters, the architects have provided an attractive result with a combination of dark, highly polished marble and mirrors. The field over the marquee consists entirely of terra cotta, with a marble ornament inserted at the top with a molded terra cotta frieze and coping above.

Because of the peculiarities of the location, the front elevation becomes a part of the long-side elevation. The side of the auditorium is completed in face brick.

Solid birch slab doors, 2¼ inches thick, centered with glass, lead into the lobby, where a solid birch refreshment bar extends the entire length of the right wall.

THE FRONT ELEVATION of the Dabel Theatre combines green-veined white Georgia marble facing, trimmed with cream colored terra cotta. The left side of the front elevation represents a marble shaft capped with multi-colored terra cotta moldings which wrap themselves around the top of the tower and then travel down the tower's side to the ground. The tower to the left of the front elevation is ornamented by stylized channel letters which spell out the name of the theatre. The remainder of the front elevation is designed in the mode of modern classic ideas faced in buff brick.





IN THE LOBBY a solid birch refreshment bar extends the entire length of the right wall. The plaster walls are painted aqua with red and sunset yellow trim. The outer doors are solid birch slab centered with glass, while the inner doors are similar without having the glass insert panels.



THE FOYER has a large mural, painted in shades of blue, of a startled fawn in the midst of a snowswept setting. The left wall of the foyer is curved and finished in Indian red combed plaster. Two of the mural blue shades, a salmon pink, and cedar rose are used on the other walls.

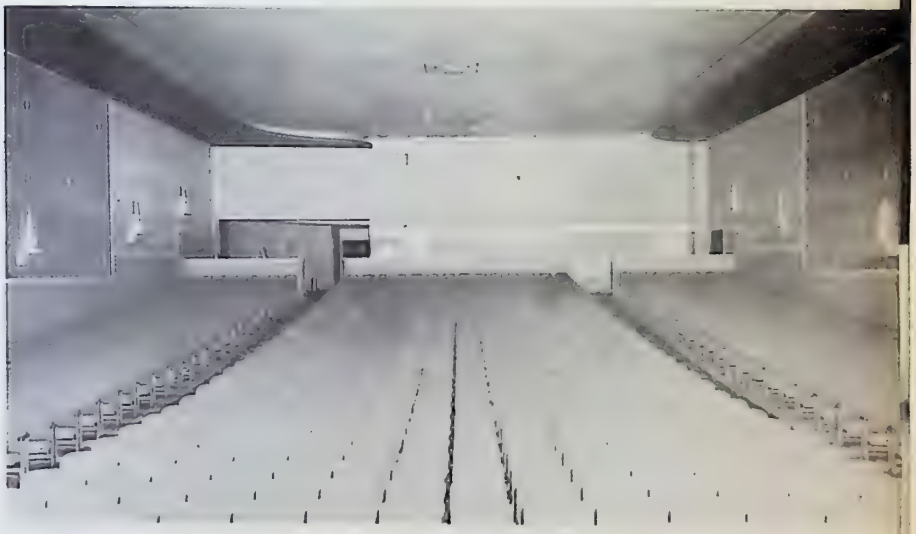
A popcorn machine is included, beside the spacious two-shelf candy counter. The plaster walls are painted aqua, with red and sunset yellow trim. The lobby mat is by United States Rubber Company, Display frames are Sealuxe, by Universal Corporation. Cashiers operate General Register Corporation Automatickets and Coin-O-Meters, by Universal Stamping and Manufacturing Company. The doorman uses a Newman ticket chopper.

The foyer has a large mural, conspicuous upon entrance, painted in shades of blue. It is of a startled fawn in the midst of a snowswept setting. The left wall of the foyer is curved and finished in Indian red combed plaster. Two of the blue shades used in the mural, salmon pink, and cedar rose are the colors of the other walls.

The manager's office is located directly off the foyer to the right. Men's and ladies' rest rooms are to the left. The foyer curves around the rest room area to space opening through an arch, for the rest room area screens the auditorium. The auditorium ceiling has a beige field, accentuated by a lower leveled portion in cocoa brown, which is outlined in burnt orange neon tubing. Burnt orange recessed lights, in rectangular coffers, are centered in a straight line on the higher level. The recesses also suspend air diffusers.

A gray wainscoting forms the base of the auditorium wall treatment. Toward the back of the auditorium, the upper halves of the side walls are covered with peacock blue glass fabric, relieved with white geometric designs. The middle walls are of red grape-colored glass fabric, with a sprinkling of four-pointed stars serving as a background for two large oyster-white plaster moons. To the left and right of the stage, two large French baroque cast plaster ornaments are mounted against cocoa brown backgrounds set against warm beige fields. These ornamental panels sustain the colors used in the ceiling.

Other equipment items for the Dabel Theatre include sound equipment and screen, by Radio Corporation of America; carpeting, through Greater New York Carpet Company; seating, by Kroehler Manufacturing Company; projectors and projection lamps, by Brenkert Light Projection Company; enclosed rewind, by Goldberg Brothers; and vacuum cleaner, by National Super Service.



IN THE AUDITORIUM, the ceiling has a beige field accentuated by a lower leveled portion in cocoa brown, which is outlined in burnt orange neon tubing. Burnt orange recessed lights, in rectangular coffers, are centered in a straight line on the higher level. Toward the back, the upper halves of the side walls are covered with peacock blue glass fabric, relieved by white geometric designs.

IN THE POWDER ROOM, a large mirror, with a glass-topped cosmetic shelf, is a part of the decorative scheme that gives roominess and height to the carpeted area. This suite, as well as the men's, is to the left of the foyer, while the manager's office is at the right. The foyer curves around the rest room area to space opening through an arch, for the rest room area screens the auditorium.



504-Seat Cinema Serves 4,500 in the Tidewater Section of Virginia

Donk's Theatre

After some thirteen months of exasperation, delays in construction and delivery of equipment, and other vicissitudes of early post-war theatre building, W. C. (Donk) Dunton opened his new theatre, possessively named with pardonable pride after himself, in Hudgins (Chimney Corner), Mathews County, Virginia, early last summer.

Constructed of cinder block and concrete block, and finished in a paint job of white and cream, the 504-seat theatre is designed to serve a rural population estimated 4,500. For those coming by car from the more outlying areas, Dunton has provided a parking lot some 100 by 150 feet, about three times the footage covered by the theatre proper.

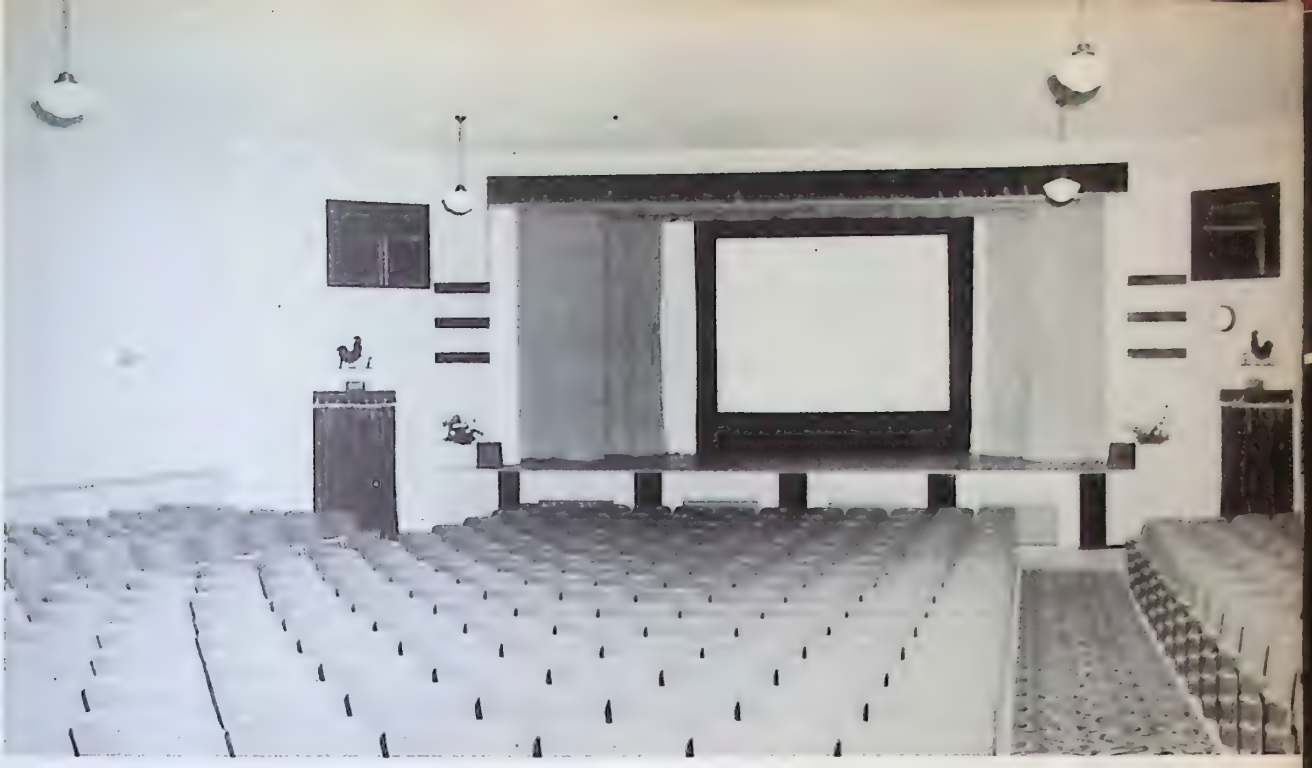
From the standpoint of architectural magnificence of urban cinemas, Donk's Theatre would win few prizes; but, when it is considered that Dudgins enrolled only 12 souls in the 1940 census and that its present development dates from 1945, the theatre is indeed the Music Hall of the area, a rating augmented by the items of equipment installed for the comfort and convenience of the patrons, items comparable with those which are to be found in houses costing even ten times the approximately $40,000 of this theatre. Indeed, the differences are in quantity rather than in quality.

In the construction of the theatre material has been selected, for the auditorium, for example, that can be decorated with paint without deleteriously affecting the acoustic characteristics of the room, thus effecting a considerable saving in decoration. Other economies have been made, but whatever the saving it generally shows up on the debit side, since patron comfort has not been sacrificed by installing of items less than the best.

Perhaps the type of theatre here presented may be a regular construction method adaptable to many small communities, where the economic considerations might preclude a more splendiferous structure. Indeed, such construction savings might be applied toward even better equipment, the while keeping the over-all cost down to a modest figure.

DONK'S THEATRE, in Hudgins, Mathews County, Virginia, shows what can be done to provide the smaller communities with relatively inexpensive but yet modern theatre facilities. Constructed of cinder and cement blocks, with outside surfaces painted white and cream, the theatre, of 504 seats, despite architectural magnificence, is admirably suited to its locale and provides entertainment reception for a potential draw of 4,500 in which nothing has been sacrificed to bring the people the best within such inexorable limits as may be imposed by purely economic considerations.





THE AUDITORIUM is a paint-decoration job, with tones of red and blue, and touches of gold, applied in such a way as to take advantage of the tile effects possible for the nature of the cinder-block construction of the side walls and the tile ceiling treatment. Sufficient stage space, with the requisite number of curtains, has been provided to take advantage of possibilities presented by traveling presentations and civic celebrations. Small though the theatre may be, the 504 chairs are of a type and manufacture found in many a city theatre several times the size of this one.

REFERENCE CREDITS

DONK'S THEATRE

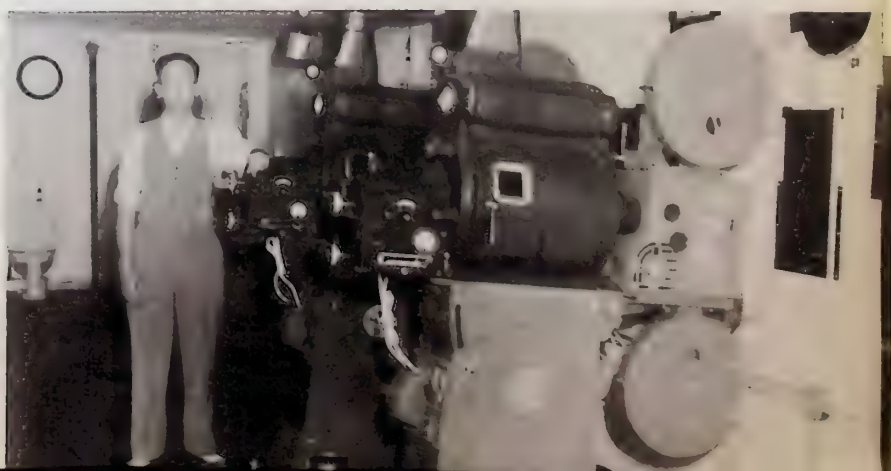
Hudgins, Virginia

OWNER AND OPERATOR: W. C. Dunton.
SEATING CAPACITY: 504.
COST OF BUILDING: approximately $22,000.
COST OF EQUIPMENT: approximately $18,000.

AIR CONDITIONING: Blowers, by United States Air Conditioning Corporation.
CARPETS: by Mohawk Carpet Mills, Inc.
CHAIRS: by International Seat Corporation.
CHANGEOVERS: Strong Zipper, by Essannay Electric Manufacturing Company, through DeVry Corporation.
COIN CHANGER: Coin-O-Meter, by Universal Stamping and Manufacturing Company.
CURTAIN CONTROLS AND TRACK: by Vallen, Inc.
DISPLAY FRAMES: by Poblocki and Sons.
DRAPERIES AND STAGE CURTAINS: through Brient Decorating Service.
FILM CABINETS: Neumade, by Neumade Products Corporation.
HEATING EQUIPMENT: through Elmer H. Brient and Sons.
LENSES: Super-Lite, by Projection Optics Company, Inc.
LIGHTING FIXTURES: Voigt Company.
PROJECTION LAMPS: Enarc, by Brenkert Light Projection Company.
PROJECTION MACHINES: by DeVry Corporation.
RECTIFIERS: by Garver Electric Company.
REWINDERS: Neumade, by Neumade Products Corporation.
RUBBER MATS: by Perfo Mat and Rubber Company.
SCREEN: through Radio Corporation of America.
SIGN AND MARQUEE: Talley Neon Company.
SIGN LETTERS: by Wagner Sign Service, Inc.
SOUND: by DeVry Corporation.
SUPPLY DEALER: Elmer H. Brient and Sons.
TICKET-ISSUING MACHINE: Automaticket, by General Register Corporation.
TICKET CHOPPER: by Golde Manufacturing Company.
VENDING EQUIPMENT: Popcorn machine, by Star Manufacturing Company.



THE LOUNGE (above) is another paint job, done in powder blue and gold (a similar color scheme obtains in the lounge rooms). Posters announcing coming attractions replace the usual art.



THE PROJECTION ROOM (below) is a typical dual installation of modern equipment, designed to give the patrons the finest possible reproduction from Hollywood's sound tracks and pictures.

Black-Light Murals Adorn an Auditorium in Fall River, Massachusetts

The Embassy Theatre

The Embassy Theatre, in Fall River, Massachusetts, was designed by George S. Darling who also has all the work of Frank J. Phillips, the general contractor, under his supervision.

The architectural motif of the new theatre is Neo-Colonial, with theatricalism held down to a marquee surmounted by the theatre name in neon-lined, single letters. The marquee was furnished and installed by the Donnolly Sign Company. The Neo-Colonial idea, starting with the reconstruction of Williamsburg, Virginia, and becoming a definite trend in the Old Dominion, and the South in general, is spreading to more distant areas.

A particular note of the auditorium is the use of two 20-by-20-foot murals, located on either side of the stage. Representing somewhat stylized colonial scenes, the paintings are done with material which will fluoresce under the influence of black light, thus making the murals decorative adjuncts to the auditorium whether the house lights are up before or after the show or between shows or whether the house is darkened for the presentation of motion picture entertainment.

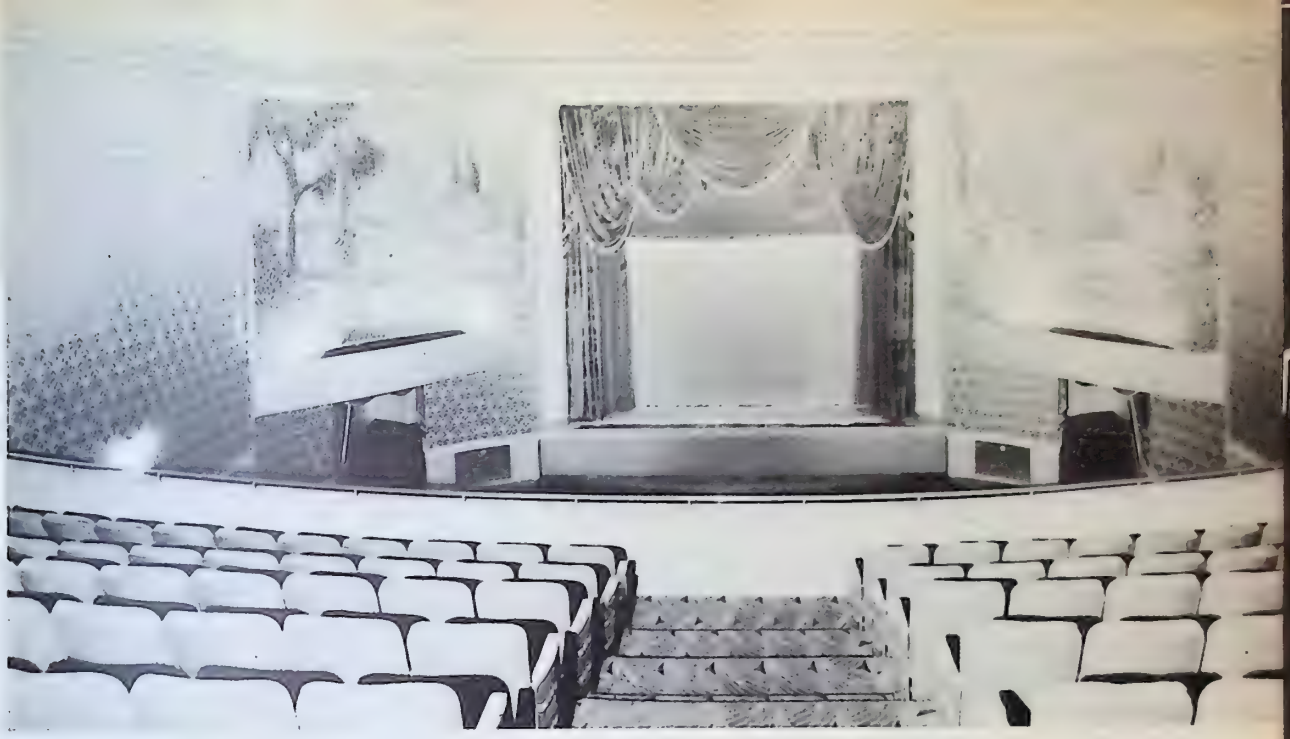
All painting, decorating, stage settings, and murals were furnished and installed by Novelty Scenic Studios.

All the booth equipment, as well as the chairs and other items throughout the theatre were furnished and installed by the Capitol Theatre Supply Company.

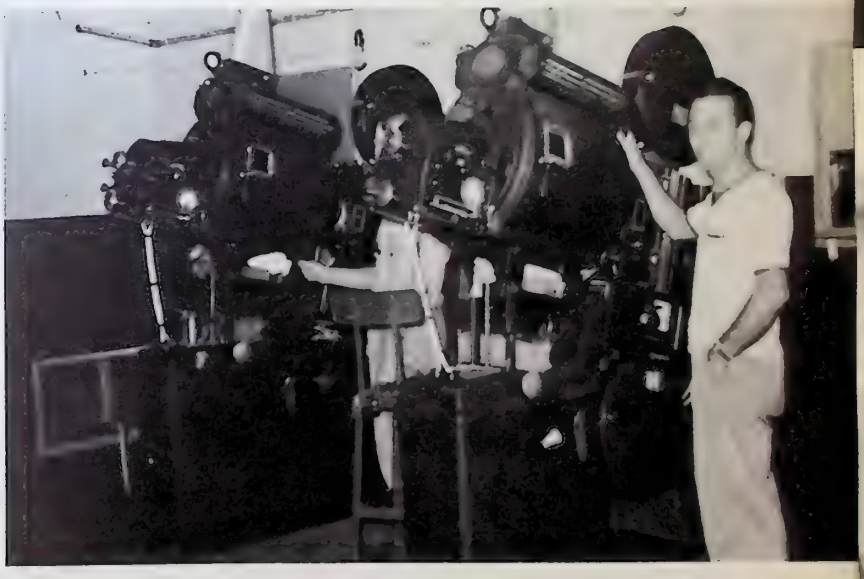
Other credits include these: hardware, by J. O. Neill Supply Company; interior mill work, by J. T. O'Connell; inlaid linoleum, by Saunders Carpet and Linoleum Company; lobby display frames, through the National Theatre Supply; heating, ventilation, and air conditioning, by Frank Dupuis; electrical contracting, by S. Baron and Son; Master-Craft oil burner, installed by Mathieu Coal Company; tile work, by Venturini Brothers; rugs, installed by Joseph Jackson; plumbing, by Frank Mazzoni; emergency lighting system, by Brady Electrical Company, Inc.; excavation, by A. J. Edmond; and sheet metal work, by F. R. Sheet Metal Company, Inc.

THE EMBASSY THEATRE, in Fall River, Massachusetts, was designed by George S. Darling in a Neo-Colonial motif. Of brick facing, with light stone footings and entrance area, the theatre, save for the name signs, in single, neon-outlined letters, surmounting the marquee with program boards providing for three lines of changeable letters, presents the aspect more of a community hall than a cinema. At night, twenty flood lights, geometrically arranged in the soffit, illuminate the entrance area through which ingress is made by three kick-plated pairs of full-paned doors.



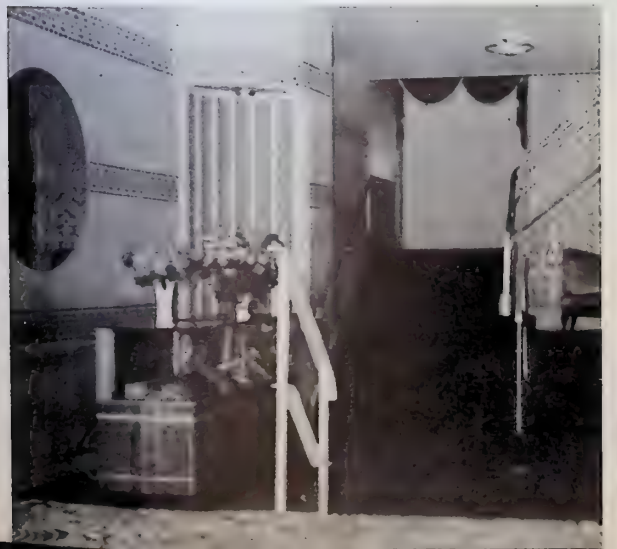


THE AUDITORIUM has two seating levels. Here (above), looking toward the screen from the loge area, are seen the two hand-painted murals on either side of the stage. The panels, each 20 by 20 feet, were done by Novelty Scenic Studios, which also furnished and installed the other decorating and stage settings. The use of special fluorescent material, under the influence of black light, brings out the composition of the murals in darkness. The theatre chairs were manufactured by International Seat Company, upholstered in coral mohair, adding to the decoration.



THE PROJECTION ROOM (right) has been equipped with projector machines and Enarc projection arc lamps by the Brenkert Light Projection Company and a sound system by the Radio Corporation of America. The booth equipment (as well as the auditorium and loge chairs) was furnished and installed by the Capitol Theatre Supply Company. Further credits are not available, but it can be supposed that other items of the RCA dealer's stock would have found their way into the various parts of the house dubbed "the theatre of distinction and comfort."

THE LOBBY, looking to the right (left, below) and to the left (right, below), is carpeted—except for the rubber matting in the main traffic area in front of the entrance doors—wih a pattern done in red and gold. Blue damask has been applied to the wall opposite the entrance. The loges are also carpeted throughout, with soft lighting adding to the decorative scheme. The hand rails in the main lobby are of polished alumninum. A candy counter has been placed right opposite the entrance doors, a convenient spot for all the theatre's patrons who desire to purchase items.

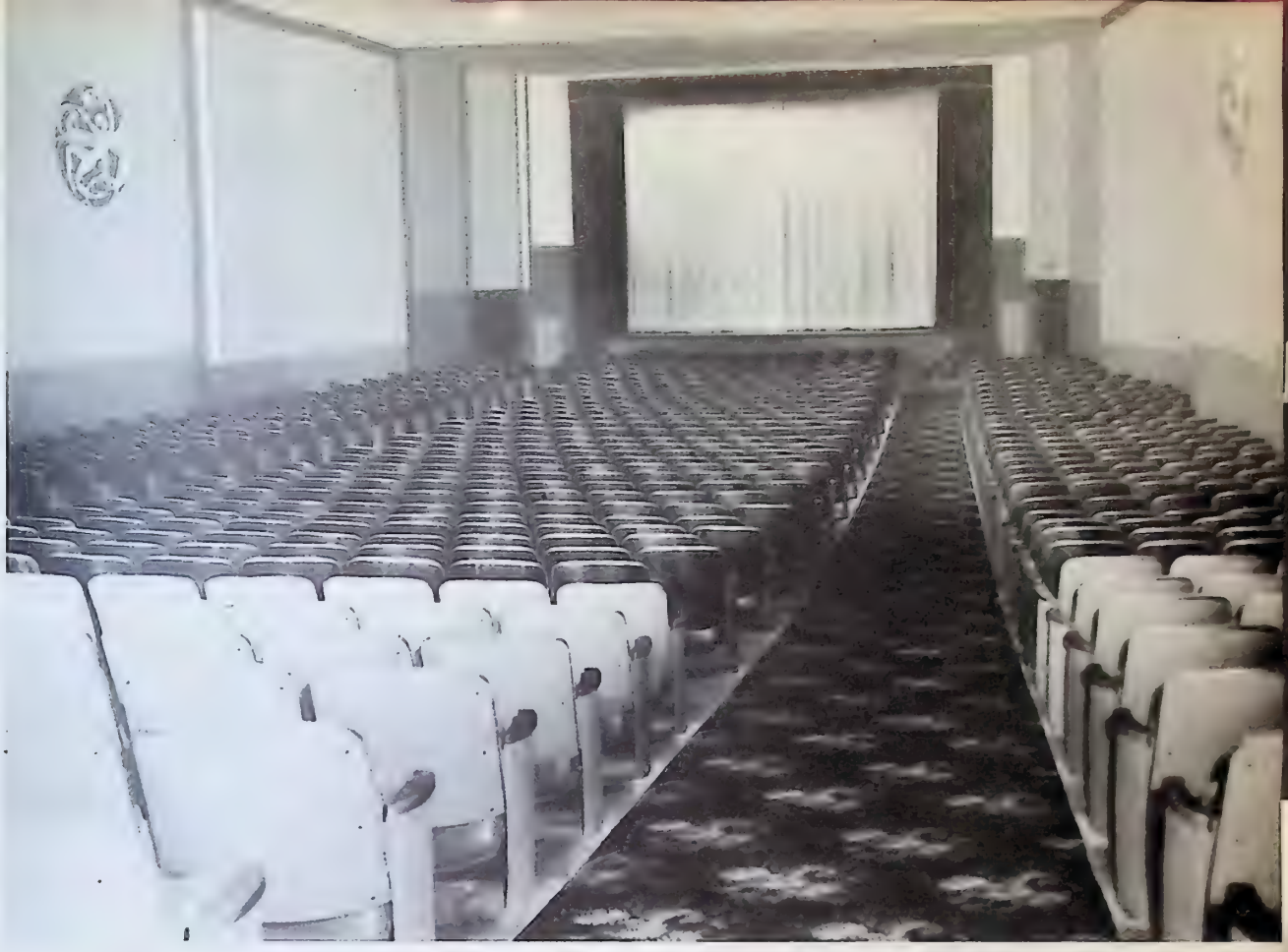




A 900-Seat, Air-Conditioned Cinema Comes to Upland, California

The Grove Theatre





THE AUDITORIUM of the Grove Theatre is another example of the architect's idea of a comparatively plain interior, but with plenty of flash and embellishment of ornament on the front. The auditorium seats 900 on one floor. The walls are finished plainly, with stylized circular plaques in the central portion to relieve what otherwise might prove to be a monotonous spread of soft colors. The aisles are carpeted. The stage is traditionally draped, with a valance and legs of a dark material in back of which is the front traveler done in a lighter contrasting shade of color.

The Grove Theatre, owned and operated by the Western Amusement Company in Upland, California, was designed by Jack Corgan.

It is built of reinforced concrete, with the front (see opposite page) dominated by a pylon-like tower bearing the theatre name on three sides. The marquee, providing for four rows of changeable silhouette letters on the two program boards, is surmounted on either side by the theatre name in script-like letters. The fronts of the two stores, adjacent to the theatre entrance (with its island box office), are finished in keeping with the theatre. Properly distributed around the front area are eight display frames for announcing current and coming shows.

The auditorium of the theatre has some 900 seats on one floor. The decorative scheme is one of comparative plainness, in accordance with the architect's ideas that the greater amount of flash and embellishment should be outside and front of the house. Indeed, the auditorium is the more strikingly plain when compared with the front, lobby, and promenade. About the only decorative aspect of the auditorium are the circular plaques on the side walls that relieve what might otherwise have been a monotonous expanse of light colors. The proscenium, with its colorful valance, legs, and travelers, add more decorative effect to the room.

In the lobby provision has been made for a recessed concession area, equipped with a popcorn machine and candy counter. In equipping the area, provision has been made for a certain degree of expansion as business expands.

The theatre is one of the few cinemas in the small towns of California which is equipped with a refrigeration system of air conditioning.

THE CONCESSION AREA is equipped with a popcorn machine and a candy counter with three shelves for the display of the various items of refreshment. Set in a recess in the lobby, the stand can be operated by a single attendant. Enough space has been provided to account for future expansion.



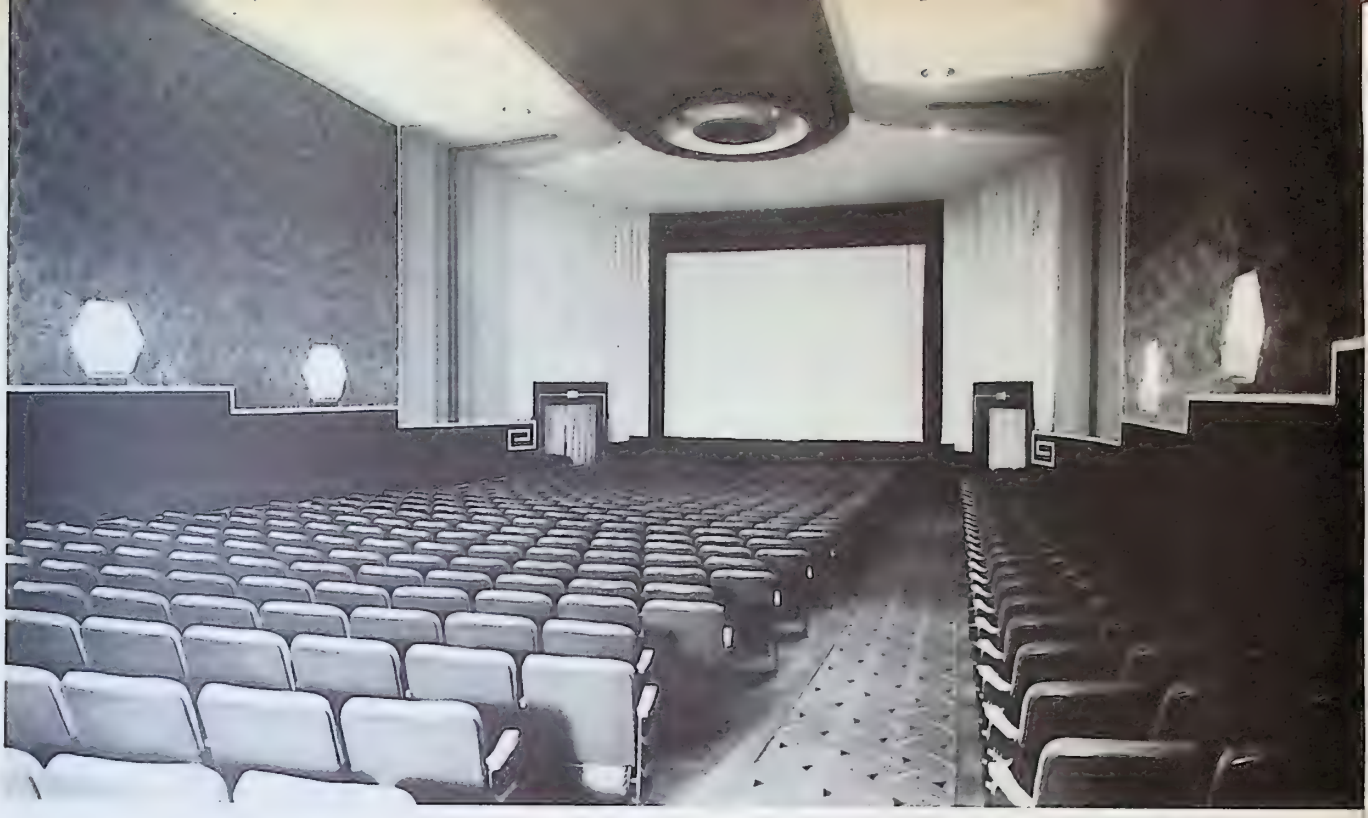
THE PROMENADE is serpentine in shape, fully carpeted, and equipped with comfortable lounge chairs. The general lighting comes from above a series of dropped circular panels in the ceiling. An intercommunication system has been provided for the convenience of the staff on duty.



Plastics and Glass Are Featured in a Cinema in Covington, Kentucky

The Madison Theatre





THE AUDITORIUM is equipped with 1,350 International chairs, Vallen curtain controls and track, and Cutler-Hammer dimmers. Projection booth equipment includes Brenkert projectors and RCA sound. Air-conditioning equipment includes Fairbanks-Morse pump, McQuay heating and cooling coils, Bishop and Babcock ventilating fans, Air Devices diffusing items, and Yates-American's Lipman compressors.

The Madison Theatre, designed by the F and Y Building Service for Covington, Kentucky, liberally takes advantage of developments in glass and plastic, using brick and terra cotta in the major facing. The facade (see opposite page) measures 54 feet wide by 46 feet high. The central panel of 12 x 12-inch glass brick is flanked by narrower panels of powder blue terra cotta, and this whole centerpiece is flanked by broader panels to terra cotta in mottled cream and tan, capped by a 16-inch fluted terra cotta coping in green. Terra cotta work by the Federal Seaboard Terra Cotta Company.

The vestibule of this 1,350-seat, two-floor theatre is enclosed by all glass doors with white transparent plastic hardware. A large confection counter in the lobby is featured by stainless steel wainscoting. The marquee was erected by the American Sign Company, and employs letters of the Wagner Sign Service.

The side walls of the auditorium are covered with spun glass fiber cloth in a pink and floral pattern above a burgundy wainscoting. Sidewall light fixtures are in three octagonal recesses on each side of the auditorium, fronted by conventionalized tulip-shaped plaster ornaments. The main ceiling, featured by a dropped center, has fluted semi-circular ends which contain neon tubing in recessed circular light troughs. Under the balcony, the ceiling is highlighted by two circular dropped portions, with transverse light troughs following the contour of the balcony front.

Alumilited hand railings grace the stairways to the mezzanine, where a spacious lounge is decorated in peach and blue. The ladies' rest room, to the left, has a blue tile wainscoting and white Georgia marble partitions. The men's rest room, to the right, has green tile, with dark cedar toilet partitions.

Drinking fountains on the mezzanine are trimmed with gray and suntan glass.



THE LOBBY (above) has Perfo mats, Tuf-Flex doors, Alumilited fittings, drinking fountains by Standard Plumbing, and directional signs by Voigt. Concession area has popcorn and candy.

THE STANDEE SPACE (below) is completely carpeted, with men's and ladies' rest rooms opening from the area, the latter shown here with the former located at the other side of the space.



Decoration Where It Is Appreciated Exemplified in Oklahoma City

The May Theatre

The May Theatre in Oklahoma City, owned and operated by Griffith Theatres of the same place, was designed by Jack Corgan. The house is L-shaped, with the auditorium position 62 by 135 feet.

The building, whose approximate cost, exclusive of ground, was $75,000, is constructed with a steel frame, masonry walls faced with brick, steel roof, and concrete floors. The house was completed and operating in approximately three months.

The exterior is dominated by a sign tower with the main part of the theatre face brick. It is a modern design, very striking in the front elevation. At night, as an accompanying picture will show, the neon-decorated tower and name letters, as well as the attraction boards on the marquee can be plainly seen over long distances.

The wall box office provides for an unobstructed entrance way about which have been placed several display frames for current and coming pictures.

The interior of the theatre is modern in treatment, with indirect cove lights, and an extremely modern concession stand. The lobby is unusually large to take care of the large crowds frequenting the theatre.

The auditorium, which seats 950, has a plain ceiling of suspended acoustic tile, and the walls are ornamented by a decorative treatment by light coves which are used for running lights emanating from light coves in the walls.

The theatre was to have had installed a gas-fired heating system and a refrigeration-type air-conditioning plant installed by United States Air Conditioning Corporation.

The May Theatre further emphasizes what can be done in the creating of theatricalism with drawing power, by developing an exterior which naturally becomes the focus of attention. On the inside, the same attractiveness is emphasized—but mainly on those areas more or less always seen under general illumination, and less on those portions of the structure that are normally darkened during the actual running of the show.

THE MAY THEATRE is dominated by a sign tower, with the three letters of the theatre name set in neon-rimmed squares seeming to fly, pennant-like, from the main shaft of the tower, an effect more pronounced by day than by night. The marquee has two three-line program boards. The soffit continues over the vestibule area on the right of which is the box office. Five large display frames, arranged to hold a variety of poster material, announce the attractions on the eye level of the passerby. Two colors of facing brick are used on the Fifteenth Street side of the theatre.



THE AUDITORIUM has a plain ceiling of suspended acoustic tile, and the walls are ornamented by a decorative treatment illuminated by light coves which are used for running lights emanating from light coves on the walls. Special stylized floral designs adorn the alternate panels of the side walls. The auditorium is 62 feet wide by 135 feet long, and the 950 seats have been arranged in a pattern using three aisles, making the tiers of chairs in blocks of 5, 10, 10, and 5, with no aisle space nearest the wall. The aisles are carpeted for silence as well as acoustics.

THE LOBBY is modern in treatment, with a crowd-control rope drawing the entering throngs almost all within an arm's length of the candy stand. The lobby is generally illuminated from coves formed by the dropped center portion of the ceiling, as well as from circular panels dropped even more.



THE NIGHT VIEW shows the neon-bedecked tower and illuminated letters of the theatre name, as well as the marquee announcement boards set with changeable silhouette letters. As in other Corgan houses, illumination has been effectively worked into the design as a potent attention-getter.



A 1,300-Seat Cinema Is Opened for the People of Colombia's Capital

The Mogador Theatre



The new, modern, deluxe Mogador Theatre in Bogota, Colombia, opened last September, a 1,300-seat addition to the entertainment facilities of the republic's capital and first city. The theatre is owned and operated by Miguel Jordan.

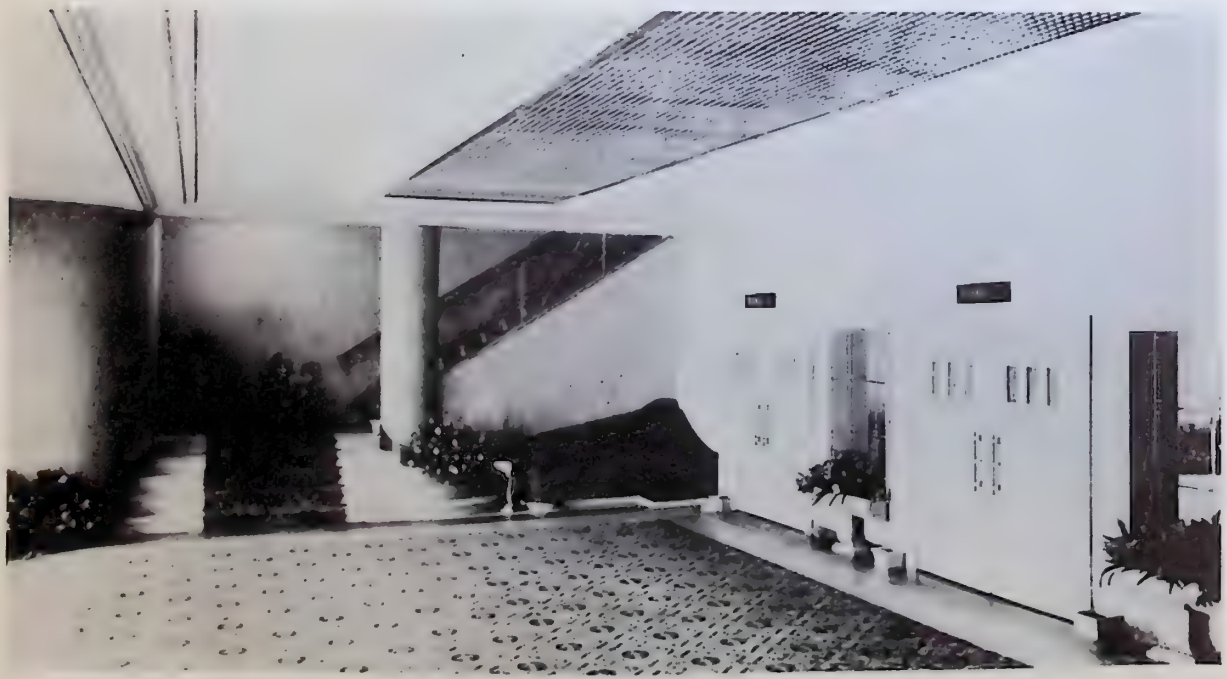
Facade of the new theatre utilizes a modest upright name sign, a shelf-like marquee with room for a long single line of changeable letters, and lots of glass. The entrance area is closed by six pairs (three sets of pairs) of four-paned doors, and above the marquee the facade is dominated by massive arrangement of windows.

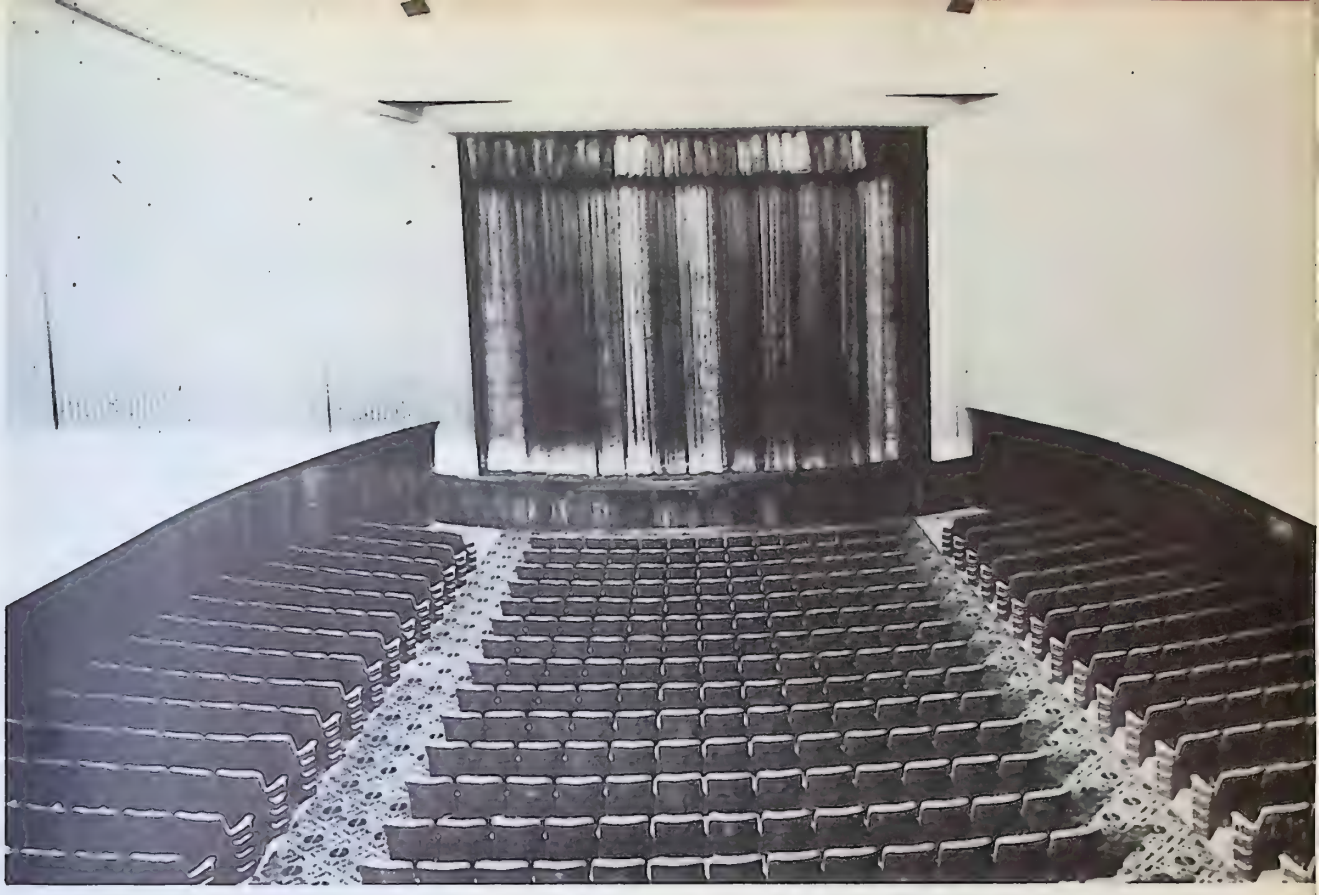
The auditorium has a main floor and a balcony, with a combined seating capacity of approximately 1,300. Architecturally, the auditorium is very plain, with light colored, tightly fluted wall panels relieving the evenness of otherwise flat areas. The proscenium hangings and stage curtains add the requisite touch of color.

The projection booth is a triple installation, with Brenkert projectors and arc-lighting and an RCA sound system the main items of equipment.

THE MOGADOR THEATRE (left), in Bogota, Colombia, like many another Latin American theatre, goes in for an upright sign of modest proportions, a thin marquee, and lots of glass.

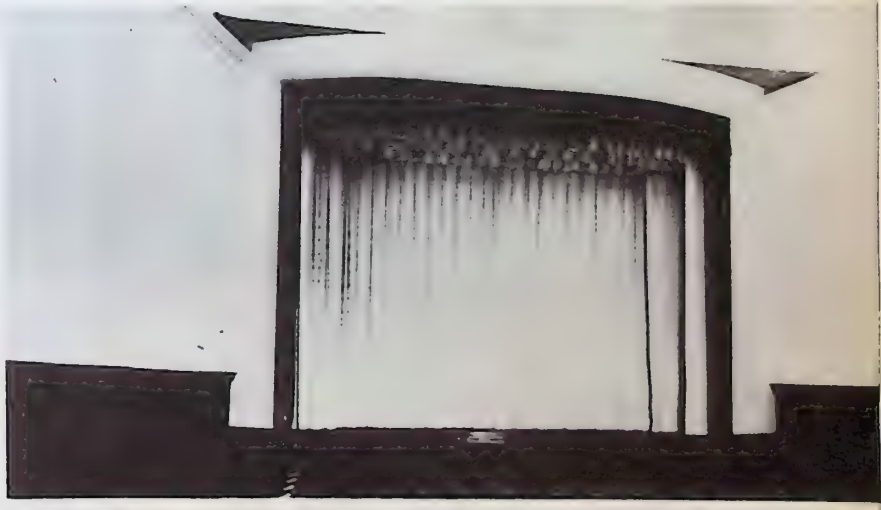
THE FOYER (below) is spacious and carpeted but not from wall to wall. The doors at the right of the picture lead into the auditorium. Stairs lead to the seating area in the balcony.





THE AUDITORIUM, as viewed from the balcony (above), reveals a decorative treatment which emphasizes architectural simplicity and light colors, with colorful stage draperies and curtains to add the all-important contrasts. On the two seating levels, the theatre accommodates patrons comfortably to the approximate number of 1,300.

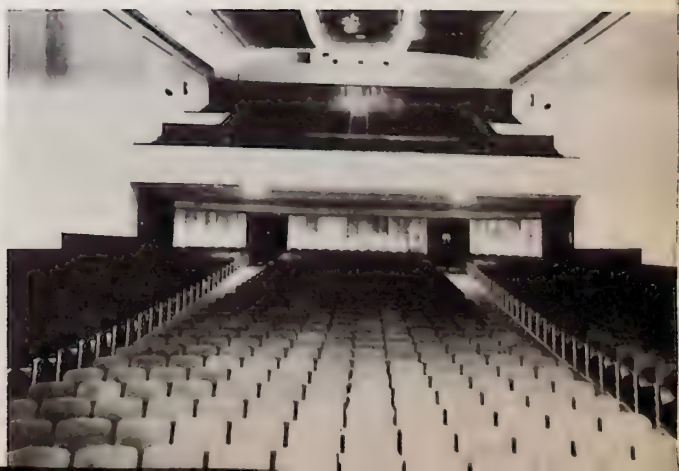
THE PROSCENIUM, with the grand drape opened (right), shows better the design of the stage and the use of the stage hangings. Note in these two pictures the treatment of the wainscoting, which not only is higher than usual but is brought forward to the arch itself and then blended with the rise of apron of the stage.



THE BALCONY (bottom right) is divided into two parts, as in American theatres, in a loge section and the general seating area further back. Only a single observation port has been provided for the three projection machines. The largest window may indicate the placement of future spotlight, effects machines, and the like.

THE PROJECTION ROOM (bottom left) boasts a triple equipment installation. Projection machines and bases and the Enarc projection lamps are by the Brenkert Light Projection Company, with a sound system by the Radio Corporation of America. The booth is completely protected with fusible-like fire shutters and other safety devices.





In Roswell, a 1,000-Seat Cinema Gleams in the New Mexico Sun

The Plains Theatre





THE AUDITORIUM of the Plains Theatre seats approximately 1,000 on the main floor, with a small, 30-seat balcony (at the left of the projection room) reserved for the exclusive use of Negro patrons. The walls are finished with acoustic plaster. The semi-hexagonal columns in the side walls break up the flatness of the area, permitting not only the stepping down of the wainscoting, but also adding to the good acoustic characteristic of the auditorium. The central block of seats achieves staggering through use of one less chair in alternate rows of seats.

The new Plains Theatre, designed by Jack Corgan, and recently opened in Roswell, New Mexico, seats 1,000 people on one floor. The house has a small balcony, with approximately 30 seats, for the exclusive use of Negro patrons. The theatre is adequately equipped with a cry room, smoking rooms, and such other patron facilities as are needed in this type of theatre.

It will be seen from the pictures that the front (see page opposite) is extremely colorful and flashy, carrying out the architect's idea of a lot of flash on the front of these theatres but, at the same time, a comparativley plain auditorium, thus placing the attention-getting elements of theatricalism where they will do the most good, as reflected by the total on the box-office statements.

The Plains Theatre is one of the most modern and newest theatres to be built in New Mexico and would do credit to most of the towns in any part of the country. This cinema, owned and operated by Theatre Enterprises, is constructed of reinforced concrete, with acoustic plaster on the auditorium walls. Modern equipment and furnishings accentuate the smartness of design.

THE LOBBY, oval in shape, is fully carpeted. Leading from this area are doors to the ladies' and men's retiring rooms and other public and private rooms of the theatre. The drinking fountain is set in a tile-faced recess behind a torii-like pair of shafts topped by a modernistic entablature.



THE FRONT of the theatre by day, as by night (see opposite page), is dominated by the upright name sign, applied to the facade of the house starting a few feet above the top of the marquee. The two program boards of the triangular marquee utilizes the display advantage of two letter sizes.



An 80-Foot Sign Dominates a Front in Huntington, West Virginia

The Tipton Theatre



The new Tipton Theatre, designed by the F and Y Building Service, is located in the center of the business shopping district of Huntington, West Virginia.

A huge green-and-white porcelain sign, approximately 80 feet in height, rising out of the marquee, topped with neon-outlined channel letters facing in two directions, dominates the entire area.

The box office, centered on the sidewalk, is featured with tall panes of glass which meet the huge glass entrance doors.

Desert colors distinguish the inside traffic area. The ceiling, in a warm sand tone, is accentuated by vari-colored neon tubing concealed around the entire edge of the lobby. Indian red side walls, a huge and novel confection stand trimmed in solid birch, and eight solid birch-framed doors centered with fluted glass panels make an attractive picture.

The foyer is a handsome combination of desert sky blue and Indian red. The desert sky blue ceiling is highlighted by a huge rectangular lighting trough.

The auditorium has side walls covered with wine-colored glass-fiber cloth to the edge of the balcony. Plum-colored wainscoting travels completely around the auditorium. Large French baroque cast plaster lighting ornaments, especially designed, are associated with a wide band of old ivory tone above the wainscoting.

The ceiling of the auditorium is patterned with a central section of midnight blue, containing circular indirect lighting troughs of various sizes, each suspending an air diffuser.

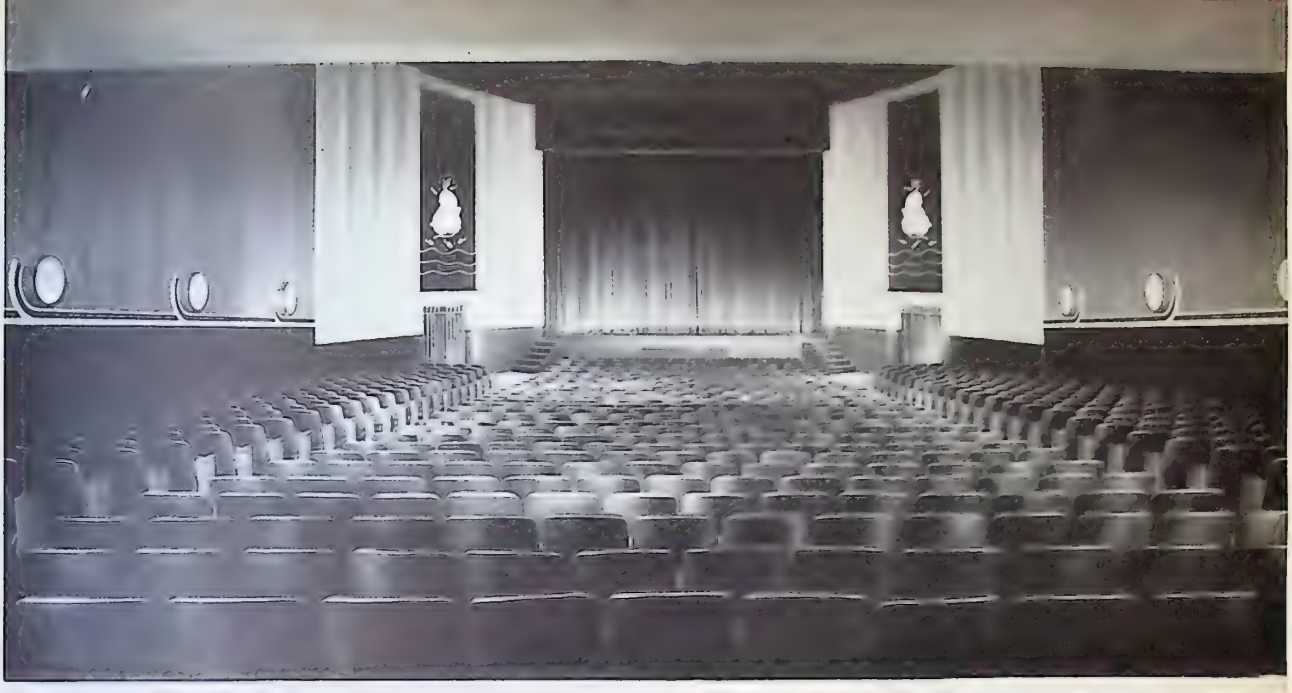
Among the construction credits are these: Terra cotta front, by Federal Seaboard Terra Cotta Company; letters and attraction panels, by Wagner Sign Service, Inc.

Equipment in the front part of the theatre includes these items: Automaticket registers, by General Register Corporation; coin machine, by Johnson Fare Box Company; lobby mats, by United States Rubber Company.

Other interior items include: Carpeting, by Alexander Smith and Sons Carpet Company; chairs, by American Seating Company; curtain controls and track, by Automatic Devices Company; dimmers, by Ward-Leonard; drinking fountain, by Westinghouse; electric hand driers, by Chicago Hardware.

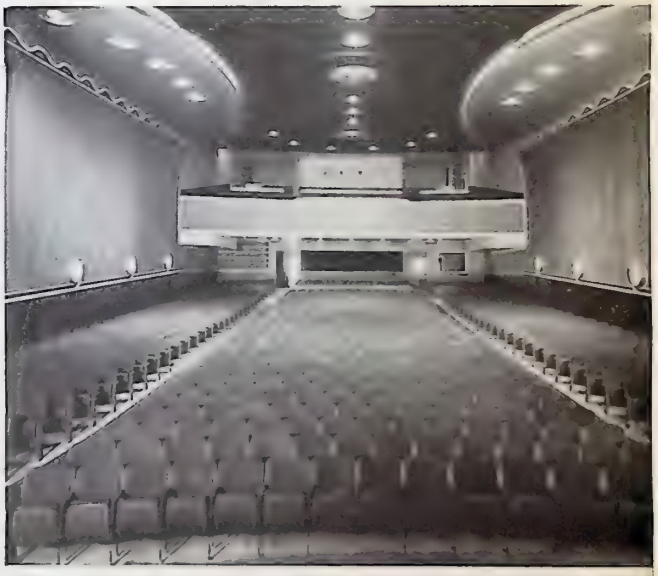
Projection booth equipment includes: Projectors, by Motiograph; sound, by Motiograph-Mirrophonic (with Altec Lansing Voice of the Theatre speakers); Mogul arc lamps and rectifiers, by Strong Electric Company; screen, by Da-Lite; rewinder, by Golde; film cabinet, by Neumade; splicer, by Griswold.

Items of the air-conditioning system include: Heating and cooling coils, by McQuay; ventilating fans, by Bishop and Babcock; cooling compressors, by General Refrigeration; air diffusers, by Air Devices.



THE AUDITORIUM—looking toward the proscenium (above), toward the rear (right), or in the balcony (below)—reveals the handiwork of the decorator and that of the lighting engineer. In the ceiling, air diffusers have been incorporated as part of the decorative plan along with the lights.





THE CANDY COUNTER, located on the right hand of the entering patrons, is trimmed in solid birch. Back of the counter, with but a single layer of display space, is a large mirror which increases the appearance of lobby width. The whole area of the lobby is covered with rubber matting.

THE STANDEE RAIL is covered with a wainscoting of padded Indian red leatherette and is topped with a massive non-glare glass partition, which enables the standees to watch the picture without disturbing the patrons in the auditorium. The whole standee area is carpeted from wall to wall.





University's First All-American Is Remembered in Columbus, Ohio

The University Theatre

The University Theatre, designed by the F and Y Building Service, recently opened near the campus of the Ohio State University at Columbus.

The theatre front is faced in terra cotta in scarlet and gray, Ohio State's colors. The same colors are used in the sign and the marquee, which carries advertising equipment of the Wagner Sign Service, Inc., the panels of which are lighted with cold-cathode-type lamps.

The entrance doors of the University are of solid birch, with cast-aluminum push bars. Above them and the box office extends a panel by Sioux Metal Products of fluted aluminum, and all framing for the entrance area construction is by the same company's Nulock method of employing aluminum. The ceiling (inside marquee soffit) is of stainless steel. Recessed in the terrazzo floor of the lobby are scarlet mats. Walls and ceiling are plaster, the walls in burgundy, the ceiling in gray. Illumination is by white neon is in escalloped ceiling coves on both sides. Opposite the wall picture is a built-in refreshment bar.

Carpeting is a Karagheusian Wilton in richly flowered pattern of maroon and gray tones. Lighting here is by lensed downlights and coved neon. The standee rail is faced in plaster and capped in simulated leather. The upper panel of the rear wall and the wainscot are plaster painted burgundy, and the ceiling is gray.

All walls of the University auditorium, above a wainscot of furred cement plaster painted crimson, are of glass fabric in scarlet on gray background, with zig-zag striping except for panels at each side of the rear wall, which is striped vertically. The plaster ceiling is painted powder blue at the sides, medium blue adjoining a dropped center panel, and dark blue in the panel, which mounts air diffusers. Lensed downlights extended along the adjoining strips, and side walls carry luminaries with filament lamp troughs beneath circular plaques in gray with a scarlet O. The filament lamps are on two circuits, one for runing light. Seating is approximately 1,000, with Kroehler Manufacturing

THE UNIVERSITY THEATRE is located near the campus of Ohio State University, a location responsible for its distinction as an architectural as well as a commercial venture. The theatre front is in scarlet and gray, the University's colors, with the same tones being used in the name sign and marquee. The entrance doors are of solid birch, with cast aluminum push bars. Above them and the box office extends a panel of fluted aluminum. The marquee soffit is of stainless steel. Recessed in the terrazzo floor of the lobby are mats in scarlet complementing similar shades in the house.





THE AUDITORIUM (above) has the walls, above a wainscot of furred cement plaster painted crimson, covered with a glass fabric, with scarlet on a gray background, with zig-zag striping except for the panels at each side of the rear wall (right) which is striped vertically. The plaster ceiling is painted powder blue at the sides, medium blue adjoining a dropped center panel, and dark blue in the panel. Lensed downlights extend along the adjoining strips and the side walls carry luminaries with filament lamp troughs beneath circular plaques in gray with a scarlet letter O.

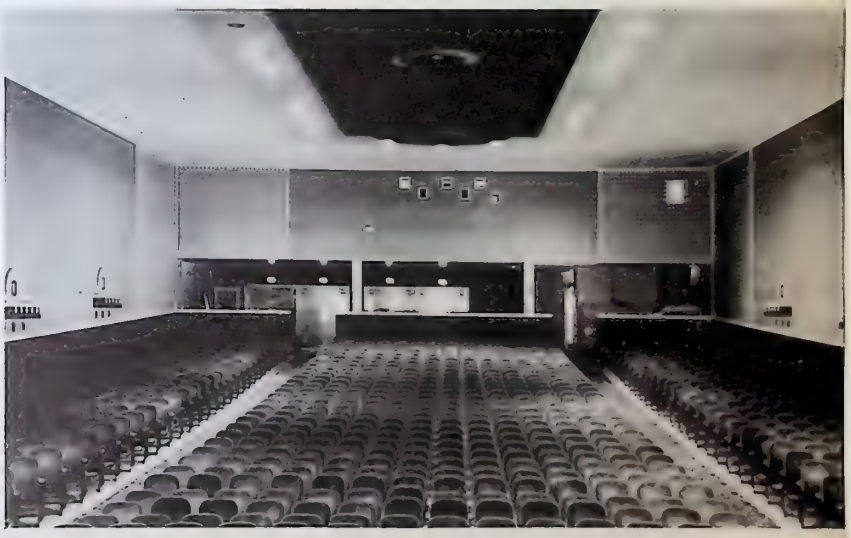
Company's Push-Back chairs. The auditorium has a bowled reverse floor slope.

The women's lounge has walls painted at entrance, and elsewhere papered in scarlet and gray stripes. The cosmetic shelf is black glass over plywood supported by chrome standards. Above the mirrors extend fluorescent lamps.

The screen platform has a rostrum at each side for student participation, and adjoining one is a Hammond electric organ.

The University Theatre is air-conditioned throughout, with a York compressor and McQuay transfer coils.

Other credits for the theatre include these: Directional signs, by Voigt Company; Gardiner Super projectors; Royal Sound Master, by Ballantyne; boilers, by Koven Waterfilm; motors, by Westinghouse; curtain controls and track, by Vallen, Inc.; glass cloth, by Business Boosters Equipment Company; and steel trusses, bary joints, and metal deck, by Macomber.



THE FOYER-STANDEE AREA, on its right wall, features a mural, picturing Charles W. (Chic) Harley, Jr., Ohio State's first and most famous All-American football player, and scenes representing his gridiron career (1916, 1917, 1919). The standee rail is well upholstered for purposes of leaning.



THE LADIES' LOUNGE is papered in a design of scarlet and gray stripes. A border of sketches of various aspects of campus life is used on some portions of the papered area, in those sections where the ceiling is not dropped to provide for the installation of the area's general cove lighting.



For $96,000, Ahuntsic, Quebec, Gets a Modern, 715-Seat Cinema

The Ahuntsic Theatre



The Ahuntsic Theatre, in Ahuntsic, Quebec, was designed by the firm of Luke, Little, and Mace for the United Amusement Corporation, Ltd. The house —costing $70,000 (including air conditioning), with $25,000 for equipment—is constructed of a steel frame, with concrete block walls and white stucco front (left) embellished with red and blue Vitrolite.

The auditorium (below) is designed to serve 715 of the area's estimated 15,000 population, composed, for the most part, of workers. In decoration three shades of salmon pink, with silver trim, has been used. The treatment of the side walls represents a departure from the usual, in that the light troughs have been placed half way between the ceiling line and the top of the wainscoting. By giving the upper portion of the wall a horizontally splayed effect, and keeping the lower portion relatively even, an unusual effect is obtained, heightened by slightly dropping the edges of the central ceiling panel.

Lounge and toilet rooms are located in the basement under the lobby (with box office on the far side from the entrance doors) and the crush lobbies on either side.



A 640-Seat Cinema Is Built in the Saint Laurent Section of Montreal

The Normandie Theatre

The Normandie Theatre, in the Saint Laurent section of Montreal, Quebec, was designed for the United Amusement Corporation, Ltd., by the firm of Luke, Little, and Mace, to serve the entertainment interests of an estimated 5,000 middle - class French - Canadians. The 640-seat theatre, constructed of concrete block, faced with brick and Vitrolite, cost about $71,400 (including air conditioning), with another $18,900 for equipment.

The front is trimmed in cadet blue and suntan Vitrolite, with the auditorium portion faced with gray cement brick. The lobby is entirely enclosed in glass, with the box office centered in the area. The lobby is lined with knotty pine, with a dark red plaster ceiling.

The auditorium walls and ceiling are finished in natural color Celotex, the plaster work at the stage end done in pale blue and salmon with silver decoration.

The men's and ladies' rooms are located in the one-story portion of the building at the extreme right, with the separate entrances separated by the stairs leading to the projection room. The standee space at the rear of the seating area serves in lieu of lounge.





After Peace and Freedom, a New Cinema for the Philippines Capital

The Republic Theatre







The Republic Theatre, which opened early last year, was designed by Zacarias Santon, with capacity of 500 in the orchestra, 50 in the loges, and 200 in the balcony. Little detailed information is available on this new theatre in Manila, Philippines, but here is a collection of pictures provided by Bela Bass of S. M. Berger and Company, Inc., showing (upper left) the front, (upper left) the lobby, (middle left) the mezzanine promenade, (bottom right) a section of the loge and balcony seats, and (bottom right) an advertising display further enhanced by the usherette staff. A definite Latin-American influence is to be noted in some of the architectural details of this post-war theatre.





Basic Factors of Design and Construction

The Fundamental Principles Are Set Forth To Guide Prospective Owners, Architects

In this article on theatre design and construction, it will be the aim to point out for the guidance of the prospective owner and his architect, the fundamental factors to consider in the original purchase of the property, the general design and layout of the theatre, and certain details peculiar to theatre construction. This series will also touch more specifically on layout of the entrance, lobby, foyer, rest rooms and other spaces required for the proper operation of a modern theatre. The mechanical requirements—heating, plumbing, air-conditioning and electric wiring—will also be discussed where such installations differ from those in other types of buildings.

The furnishings and equipment of theatres including signs, marquees, seats, carpets, and furniture will also be covered.

Suggestions for remodeling of existing theatres will be outlined at the conclusion of the series.

All of these subjects have been covered very competently at different times and in different publications, but it is hoped that their repetition and coordination here will be helpful to the readers of this magazine, as all suggestions are the result of mistakes which have been made sometime or other in the planning and actual construction of this special type of building.

GENERAL DESIGN

This section will deal primarily with problems in the construction and equipment of a theatre for showing of motion pictures only, having a seating capacity averaging between 1,000 and 1,500 seats and will not attempt to cover the more complicated problems of construction encountered in the building of larger metropolitan houses with complete stages, large balconies, and so forth.

Location of Site

In selecting a site for a new motion-picture theatre, consideration should be given to several factors which will influence the desirability of the location and each should be weighed against the other to determine the wisest and most economical course to pursue. It is quite possible that a "100 percent" location in the center of a business district or on a prominent corner would not, in the final analysis, be the most advantageous after a comparison of the cost of the land, the shape and contour of the property, availability for parking cars and the class of patronage to which the theatre is expected to cater.

Underlying Soil Conditions

In this connection it is always good insurance to have accurate knowledge of the underlying soil conditions, which may be determined by the experience of adjoining property owners, or if such information is not forthcoming, the investigation of the soil by taking borings on the property. Such investigations cost very little in comparison with the final cost should unsatisfactory bearing soil be encountered after the work is started. Usually a boring at each corner of the property and one in the center will reveal the general condition and bearing value of the soil. If the results of these borings are generally uniform, no additional investigation will be required. However, if unusual conditions show up such as rock, water, quicksand, or a great difference in the elevation of different soil strata, further borings should be made especially at the locations of concentrated load of the proposed structure.

An intelligent ananysis of the data obtained from such borings will determine whether or not the cost of the foundations required will be prohibitive in relation to the other factors heretofore mentioned.

Adaptability to Desired Size

Before committing himself for the purchase of the property, the prospective owner should have his architect advise him whether or not the theatre he has in mind can be successfully and economically accommodated to this particular location. In this connection serious thought must be given to the number of seats required, sufficient standee and lobby space, stage, retiring rooms, service rooms, exit courts and the limitations imposed by the various building codes that govern. Experience has shown the retainning of a competent architect who is familiar with the operations and requirements of a theatre and who can advise as to the adaptability and limitations of the site or sites under consideration, is an insurance to the owner which should not be overlooked.

Future Parking Facilities

Facilities for parking patrons' automobiles should be considered. In many instances it will be found that a location outside of the commercial section where the property is cheaper but where a larger plot can be purchased for approximately the same expediture, would be much more desirable. The value of parking facilities has been proven so many times that it needs no further comment here. It will also be found in many instances that it is more advantageous to develop in conjunction with the theatre and parking space, several shops and stores, or in other words a community center. The parking space in such instances serves a double purpose, i.e., parking for shopping and parking for the theatre. Since the peak loads for the shops and theatre occur at different periods of the day, there is little chance of interference or overcrowding. A simple system of checking can be installed whereby the patrons of the theatre and the connected shops are not taxed for the parking privilege.

In connection with the parking lot, a secondary entrance and box office may be incorporated in the theatre plan giving direct access to the theatre from the parking area and thereby precluding the necessity of the patrons walking to the main entrance. This is especially appreciated in inclement weather and the advertising value and good will created more than offsets the additional cost and the salaries of additional personnel required.

One thing that is very important to consider in the operation of such a parking area is that it should be well policed, well lighted at night, and the fact established in the patrons' minds that it is a safe and desirable place to leave their cars, also that they (particularly ladies) will not be subjected to any danger or annoyance in using the facility. A poorly operated parking space may become a greater liability than an asset.

Computing the Future Capacity

Before consideration is given to the purchase of a theatre site, the interested parties will have determined the seating capacity justifiable in the community and if there is a choice, the more suitable and economical site should naturally be selected.

A quick check on the number of seats on the ground or auditorium floor can be made as follows:

Determine the number of seats possible in each row across the theatre by first deducting for necessary width of side exit courts and exterior walls—6 to 8 feet is a safe figure to use for each court. If it is an interior lot, two courts will in most cases be required. Figure 4 feet for each aisle, fourteen 20-inch seats in the center banks and seven 20-inch seats for the side banks, which have aisles only on one side. For aisles which have seats only on one side, figure 3 feet.

To determine the number of rows take 5 feet from the rear wall to screen, 18 feet from screen to back of first row of seats, 10 to 12 feet for standee space, and 12 to 25 feet for lobby and entrance. The sum of these, plus a rear court if required, subtracted from the depth of the lot will give the space remaining available for seats. Divide this by the back-to-back measurement of the seat rows (2 feet 8 inches plus or minus) and the result plus one will give the number of rows. The number of rows multiplied by the seats to the row, deducting approximately 35 seats on account of sight lines at the front of the house will give the approximate number of seats on this floor. The number of seats, in a mezzanine or balcony, can be determined similarly.

An auditorium with dimensions which result in a ratio of approximately 9 units wide to 12 units deep for the first floor seating area will be found very satisfactory and economical. The wider the theatre the more seats will be lost in rows near the screen on account of sight lines and bad viewing angles.

Odd-Shaped Lots

In some instances it will be found necessary in order to locate the theatre entrance on the proper street to acquire access from such street frontage to a plot in the rear large enough to accommodate a theatre of the size required. This may result in a long narrow lobby requiring some clever architectural treatment which will interest the patrons and draw their attention from the long distance they still have to go before entering the theatre proper. However, these long passages have the advantage of the possibility of using gentle ramps for the purpose of changing elevation which may be required to arrive at the proper height at the rear row of seats.

Plot Contour and Floor Slope

A plot where natural contour has a pitch from the rear of the theatre towards the stage is always more desirable and more economical than one of which the reverse is true. Such a plot will result in less excavation and will lend itself to the construction of the necessary exit courts at the ground level, which is a far more satisfactory condition than to use steps inside the theatre, which is sometimes prohibited, than to build these ramps below the ground level thereby creating pockets for water, debris, snow and ice during the winter months.

In a motion-picture theatre it is possible to design the slope of the auditorium floor, to produce the correct sight lines, which will follow the approximate natural slope of the site by increasing or decreasing the difference in elevation of the bottom of the picture in relation to the elevation of the eye height of the last row of seats. The planning and layout of the seating areas of a theatre should be carefully checked by someone who is competent and experienced in this special work, as the proper layout will save the owner money in the original cost and will also result in a greater degree of comfort for the future patrons of the theatre.

THE THEATRE ENTRANCE

The theatre entrance is made up of several necessary component parts, which should be given careful study and consideration in order to produce an attractive and pleasing effect, and also to thoroughly sell the show, and provide for easy access and exit with the least amount of confusion.

The component parts above referred to are the signs, marquee, display frames, box office, vestibule, and entrance doors.

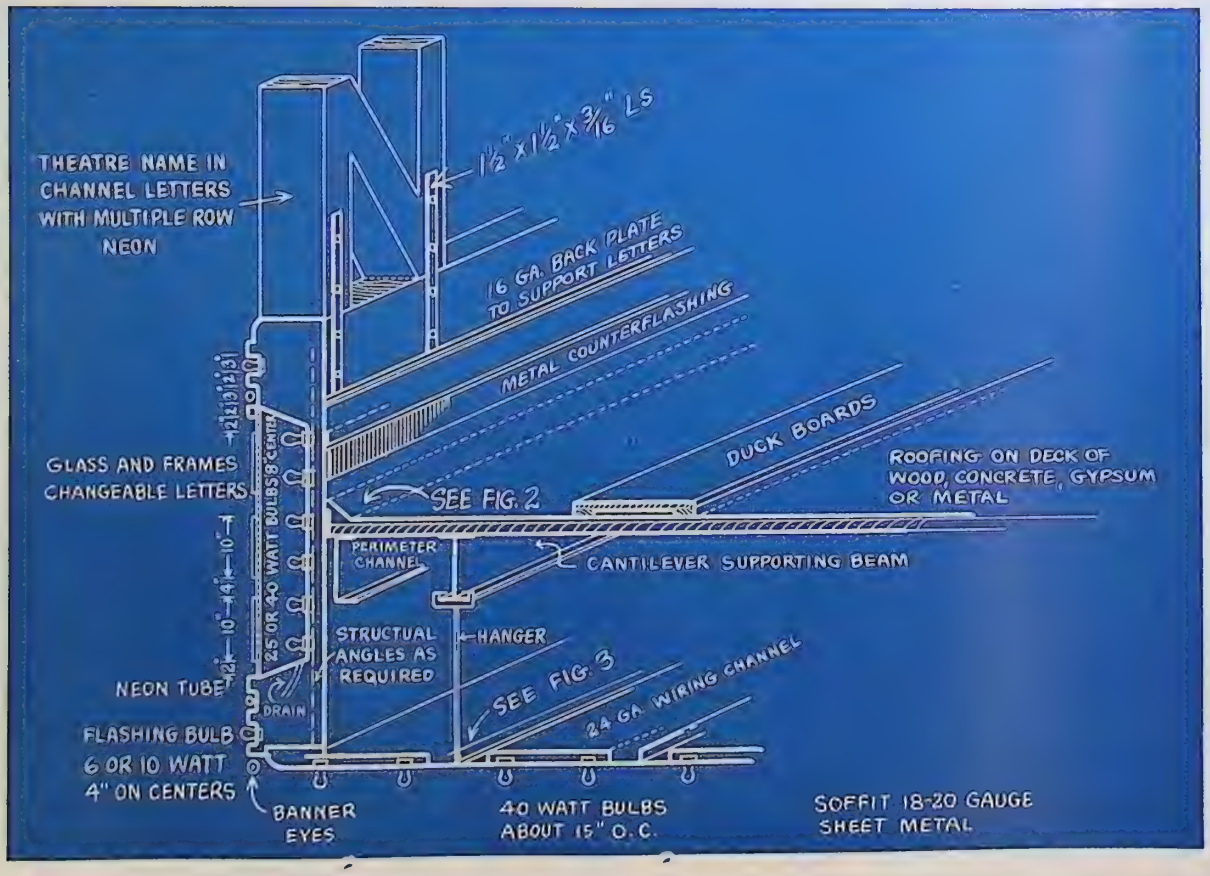
Exterior Signs

The exterior signs and the marquee are very important, not only as a means of informing the public of the name of the theatre and the current attraction, but also creating by means of attractive lighting, a certain feeling of life and gaiety at that particular spot. The attraction signs should be so designed that they will create a pleasant reaction during the daytime as well as at night when they are lighted. This can be accomplished by a design of good proportion, with a pleasing combination of colors for the name and attraction signs. Flashing on and off of certain electrical features of the sign such as the name and border attracts the eye of the potential customer and also reduces the cost of current consumption.

The signs include a vertical sign with the name of the theatre and the attraction signs on the marquee, or only the latter with the theater name displayed on the top or otherwise. The decision as to the most advantageous arrangement of signs depends on the location, and also on competitive display signs in the immediate vicinity, and keeping in mind that electric signs are expensive to operate and to maintain.

The side and front attraction signs on the marquee will be more readable from

FIGURE 1—Simplest and most effective construction of the light box is to install the light sockets on the back of a sheet-metal box which should have a depth from 7½ to 8 inches from the face of the glass. The sockets should be placed 8 inches on centers both ways, and, for highly competitive areas, should be wired for 40 watts to each socket, but for the outlying or neighborhood theatres 25 watts will be satisfactory. Some local codes limit the number of sockets to one circuit, but in no event should the total load to the electric circuit be more than 1,320 watts.



all angles, that is, directly down the street, from automobile traffic, and from the opposite side of the street if they are installed at an angle other than 90 degrees to the front of the theatre and converging towards the center. If the entrance is narrow the marquee signs will form a V, but if of normal width another attraction sign parallel with the theatre front will result. The face of this sign should be kept back at least one foot from the curb line to preclude the possibility of its being damaged by passing trucks. This requirement is found in most building codes as is the requirement of minimum height of the sign above the sidewalk. These requirements should always be checked before proceeding with the design.

Sign Lighting

There are three kinds of lighting to consider in designing theatre signs, that is, decorative lighting, lighting for changeable letters, and the lighting of the marquee soffit or ceiling.

For decorative lighting there is a choice of either neon or incandescent borders, or a combination of both. These can of course be controlled on flashers for any desired effect.

The lighting behind the changeable letters is the most important and there are certain requisites that must be adhered to in order to produce the best legibility for the letters and the message which the sign is trying to convey.

Two general types of changeable letters are in common use: First, the glass letter, mounted on sheet metal which shows the light through the letter itself; and, second, the silhouette letter, which is cast aluminum or plastic and which is hung in front of a glass panel which is completely lighted. The latter method produces a readable sign at the greater distance, and it has the further advantage of dispersing all the light produced by the current consumed, and consequently makes for a brighter theatre front.

The simplest and most effective construction of the light box behind the glass panel, to produce an even lighting over the entire surface and to prevent lamp image is to install the light sockets on the back of a sheet metal box which should have a depth from 7½ to 8 inches from the face of the glass (Figure 1). The sockets should be placed 8 inches on centers both ways, and for highly competitive areas should be wired for 40 watts to the socket, but for outlying or neighborhood theatres 25 watts to the socket will be found satisfactory. In this connection it should be noted that some local codes limit the number of sockets which can be connected to one circuit, but in no event should the total load to a circuit be more than 1,320 watts.

For maximum reflection the inside of the light box should be given a good coating of white enamel, and it is important that this surface be frequently cleaned to insure the greatest efficiency. Provision must be made for draining the light boxes since the assembly cannot be made weather-proof.

The type of glass used in these attraction signs is important. If a flashed opal glass is used, the diffusion is not good and a spotty effect will be apparent.

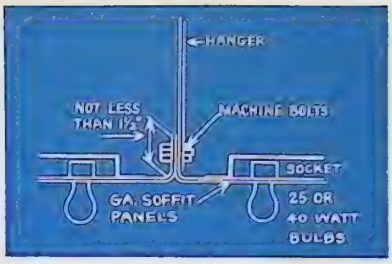


FIGURE 2—Sheet metal for a soffit should be 18 to 20 gauge and installed without visible bolts or screws by bending up the edges of the sheets batting them together, and hanging them as shown.

The best sign manufacturers use a pot-opal glass which gives the best diffusion of light and as a consequence, the best sign readability.

The use of cold-cathode tube lighting for attraction signs is being experimented with and has been used with varying success. However, the principal claim, that this type of lighting produced the same amount of illumination at less cost, is offset to a great extent by the increased cost of the necessary wiring, transformers, construction, and so forth, to accommodate the tubing.

Sheet metal used in the construction of the attraction sign should be 16 gauge to 18 gauge for the structural portions, reinforced with angle iron. For the purely decorative portions 24 gauge metal is satisfactory.

Marquee Lighting

The soffit or ceiling of the marquee can, of course, vary in design using incandescent or neon, or a combination of both in special designs, obtained by confining the lighting in open sheet metal channels producing the desired effect, but the tendency in the past few years is towards the perfectly smooth soffit with an all-over pattern of stud lighting at 12- to 18-inch centers, which gives a clean streamlined effect and sparkle and life to this area not otherwise obtained, also the greatest amount of light on the sidewalk in front of the entrance, which is desirable.

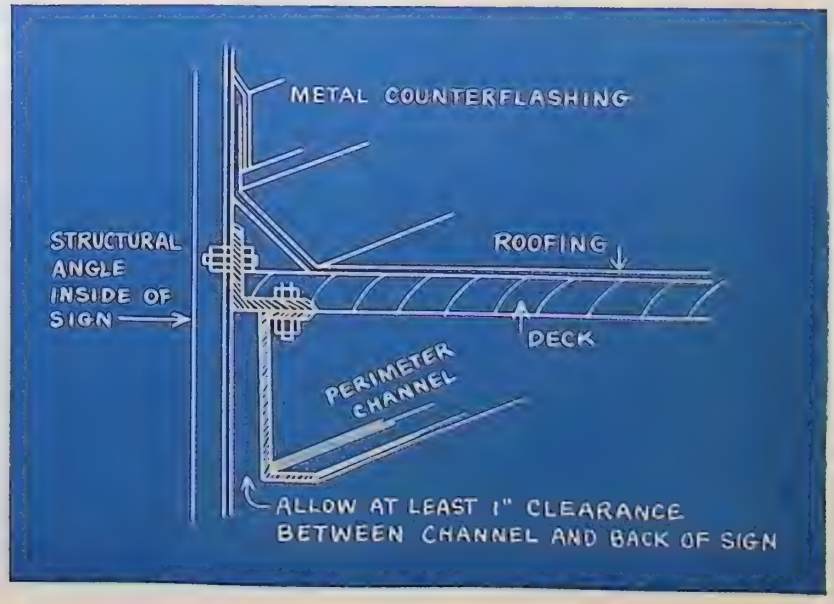
The lighting of the soffit should be wired so it can be controlled by at least three switches, one for lights around the exterior perimeter, one for the general field which can be turned off after the box office is closed, and one for a central feature. A special circuit should also be installed with outlets for flood or spot lamps which can be used to highlight display advertising underneath the marquee and special features, or both. A special outlet should also be installed near the center of the soffit and connected to the emergency lighting system, to provide light at this point in case of failure of the normal lighting service used in the theatre.

The sheet metal for a soffit as described above should be 18 to 20 gauge depending on the size of the sections used and installed without visible bolts or screws by bending up the edges of the sheets, batting them together and hanging the assembly to the structural supports (Figure 2).

Recessed or exposed "eyes" should be installed around the entire perimeter of the marquee and about 12 inches on center to provide for the hanging of special advertising banners.

After treating the metal surfaces to be painted with an acid solution, a synthetic enamel primer should first be mist sprayed on, followed by a sprayed-on coating of synthetic outdoor enamel thoroughly to cover all surfaces until the desired colors and covering result. A too heavy coating of enamel is not recommended on account of tendency to scale or crack.

FIGURE 3—In designing the supporting structure a reputable sign manufacturer should be consulted on the location of the steel channels required around the perimeter of the marquee, which must be set back the required distance from the face of the sign. Provision must be made for metal counter-flashing on the back of the finished sign which will fit over the flashing provided by the roofer.



Structural Supports

The structural supports for the marquee, the roof deck, and the roofing should be included in the general building contract and erected in conjunction with the construction. By doing so the supporting members can be cantilevered out from the building framework thereby eliminating unsightly supporting rods from the building wall to the front of the marquee.

In designing the supporting structure, the engineer should consult with a reputable sign manufacturer for information as to the location of the steel channels required around the perimeter of the marquee for the support of the attraction signs, which must set back the required distance from the face of the finished sign.

Provision should be made by the sign manufacturer for metal counterflashing on the back of the finished attraction sign which will fit over the flashing provided by the roofer (Figure 3).

The roof deck itself should be sloped to drain to a roof drain located at one corner of the marquee at the building line. From this position a downspout can be carried concealed inside the building wall and connected with the drainage system of the theatre. This is one item which is frequently overlooked in the architect's plans, and since the sign is usually one of the last operations in the construction and equipment of a theatre building, such an oversight results in exposed downspouts, which are not only unsightly but freeze in cold weather, with resulting maintenance.

Letter Storage

It will sometimes be found expedient to provide storage for the changeable letters on the roof of the marquee. This should be in a weather-proof cabinet partitioned off to file the different letters and symbols in order so that a change of copy can be made easily and quickly. If the cabinet is so located the entire deck should be covered with duck boards raised about 2 inches above the deck, which will protect the roofing from being punctured and the resulting leaks into the sign and on the sidewalk below.

If the cabinet is not located on the deck of the marquee, a store room should be provided as close to the front entrance as possible in which such a cabinet can be stored. If the cabinet is provided with rubber tire casters, it can be moved easily to the sidewalk when changing copy, which will save time and confusion and thereby considerable expense to the theatre operator in wages. A special self-supporting ladder which can be moved and used without the necessity of leaning it against the sign is recommended. This will also be found to be a time saving device, and will eliminate breakage of lamps, neon tubing, glass, and also the scratching and denting of the sign itself.

Maintenance Notes

So far as maintenance and appearance are concerned, porcelain enamel is far superior to the painting as described above, if the component parts of the sign can be constructed and erected in place without cracking or chipping the porcelain. Since heat is used in the porcelain enameling process there is sure to be some warping and shrinkage, which results in strains on the metal during assembling. If this material is used, rubber jackets or another metal such as aluminum should be used in the connections between the members. Compound curved surfaces should not be used, and the design should be kept as simple as possible.

If porcelain enamel is used and due care is exercised in the manufacture, assembly and erection so that there is no cracking or chipping of the porcelain, the sign will require no maintenance, except cleaning, for many years.

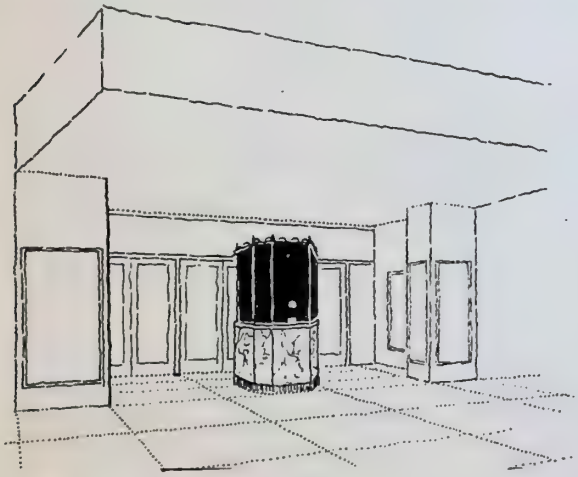


FIGURE 4—If the theatre entrance is more than 25 feet wide, the box office may be the island type, as sketched above and in diagram below. The minimum inside dimensions of the box office are 4 feet wide by 5 feet deep for one cashier, or wider if consistent with theatre design.

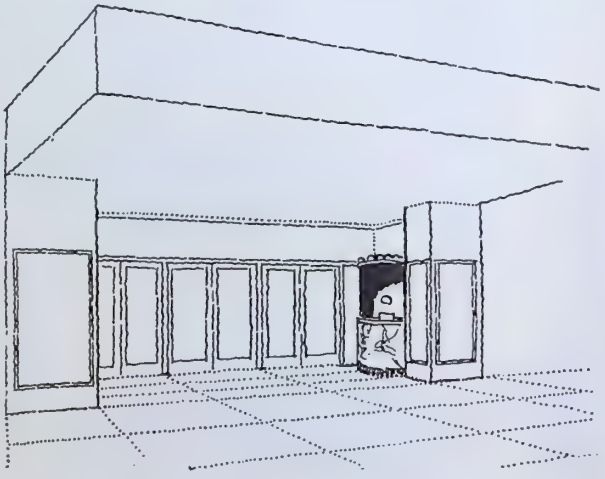
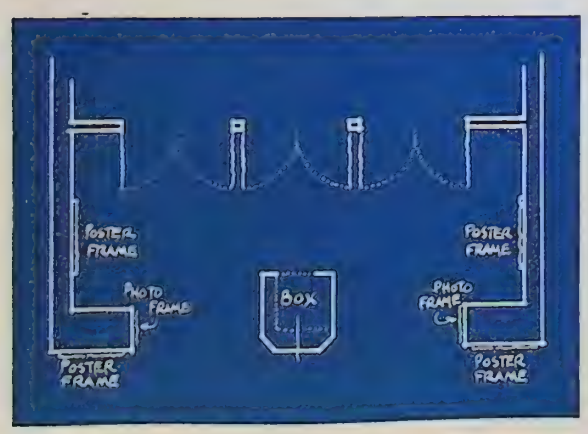
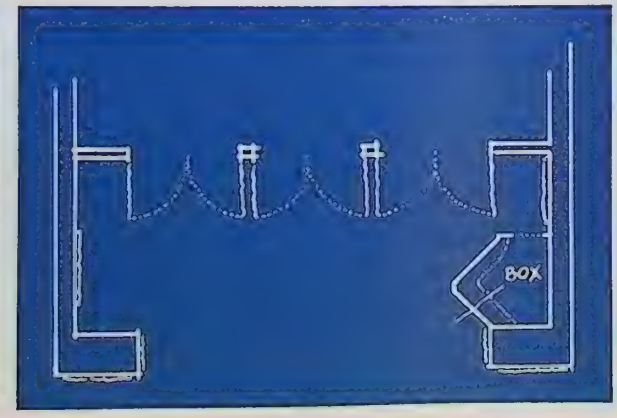


FIGURE 5—If the entrance is less than 25 feet wide, the box office should be located on the side so that the cashier faces the busy section. This type is shown above, with the plan below. The side location has advantages other than access to the box office from inside the theatre.





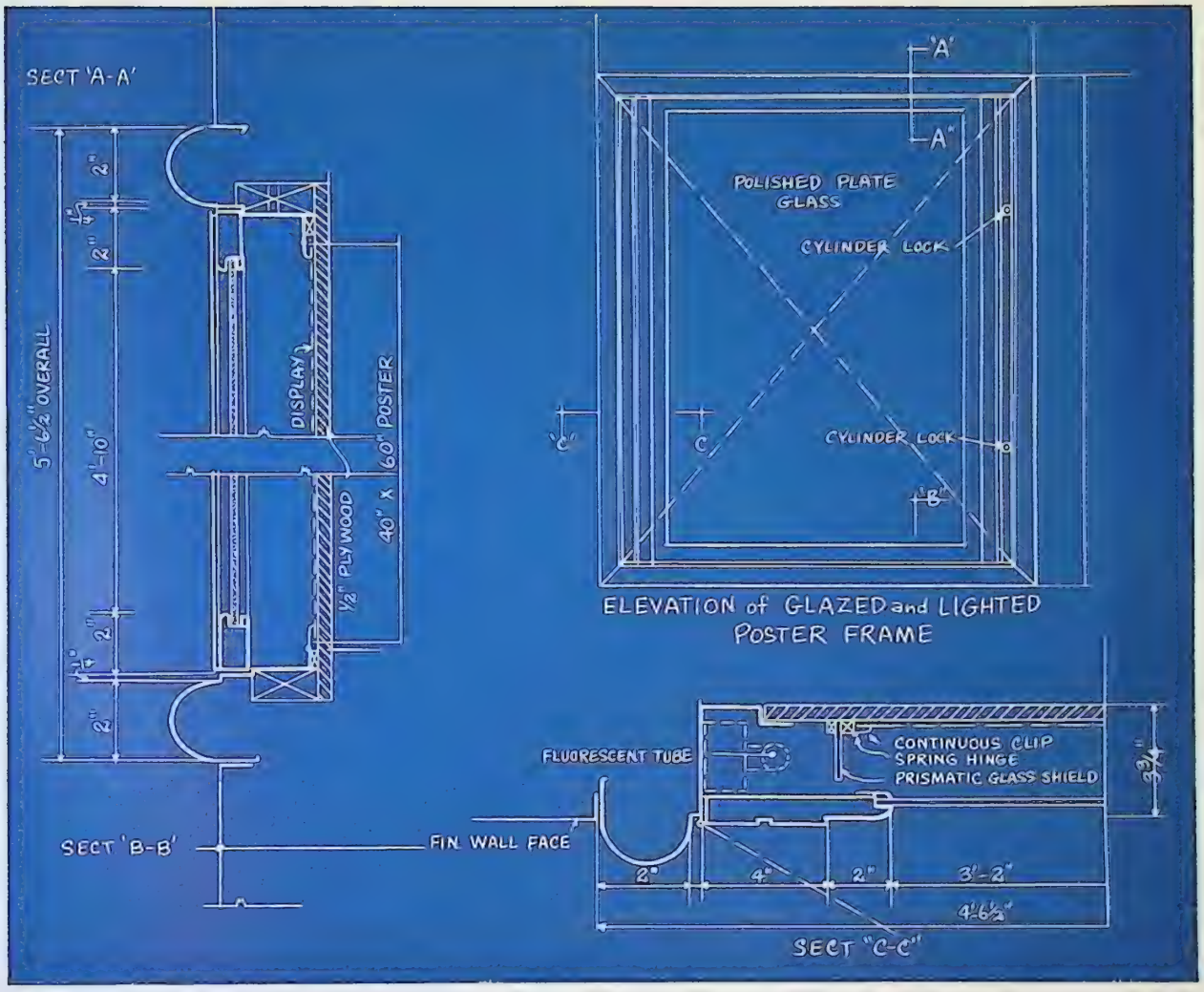


FIGURE 6—The minimum requirements for exterior frames for a theatre of the size and type discussed in this article would be four frames for 40x60-inch posters and two frames for stills. Combination corner frames, with the 40x60-inch frame on the street front and the still frame on the returns can usually be worked out. A 40x60-inch display should be used on each wall of the vestibule. The arrangement of these poster and still displays depends entirely on the width, box-office location, and depth of vestibule. Frames for 40x60-inch posters require glass fronts.

BOX-OFFICE AREA

In the previous section we discussed signs, their construction and relation to the theatre entrance. The next important item to consider is the box office, its surroundings and relation to the entrance.

The Box Office

It is important to locate the box office at or near the building line so that tickets can be purchased before entering the first line of doors. This not only facilitates the operation but also produces a certain psychological effect since prospective patrons can always see the cashier without deviating from their normal paths of travel.

If the theatre entrance is less than 25 feet in width, the box office should be located at the side of the entrance which will face the cashier towards the busy section of the neighborhood. (See Figures 4 and 5.)

With the box office so located, the result is a wide-open, pleasing entrance vestibule, which is not so if the box office is located in the center. Such a location has many other advantages also, such as possible access from inside the theatre which is decidedly beneficial in transferring the cash receipts; and also makes it more accessible for heating and air conditioning.

The minimum inside dimensions of the box office are 4 feet wide by 5 feet deep for one cashier and should be made wider if possible in keeping with good proportion and design. A theatre having 1,500 or more seats should have provisions in the box office for an auxiliary cashier which will be needed at certain rush times. This can be accomplished by lengthening the box office and providing another selling window on the side. The box office should be made as open as possible above the counter-line with glass on three sides. Below the counter, provide for money drawer and shelves with sliding doors for storage of forms, and so forth. The counter, whether it be wood, marble, or metal, will require a cutout and rabbet at the cashier's window to receive the ticket machine. This will vary in width for a three-, four-, or five-unit machine, and the size of the machine will be determined by the policy and size of the theatre.

Supports will have to be provided for the ticket machine, also a wall receptacle for the motor. Be sure and provide space for the electric motor which projects from the side of the machine near the bottom.

Provide a ceiling outlet for general lighting of the booth, also a ceiling outlet near the glass in front of the cashier for lighting the price sign. Provide conduits for both house and outside telephone, also for buzzer system.

If an island box office is used, some difficulty may result in supplying heat and air conditioning from the theatre systems. In this case include a fan outlet and an outlet for an electric heater, also provide adjustable louvered grilles in the door and ceiling.

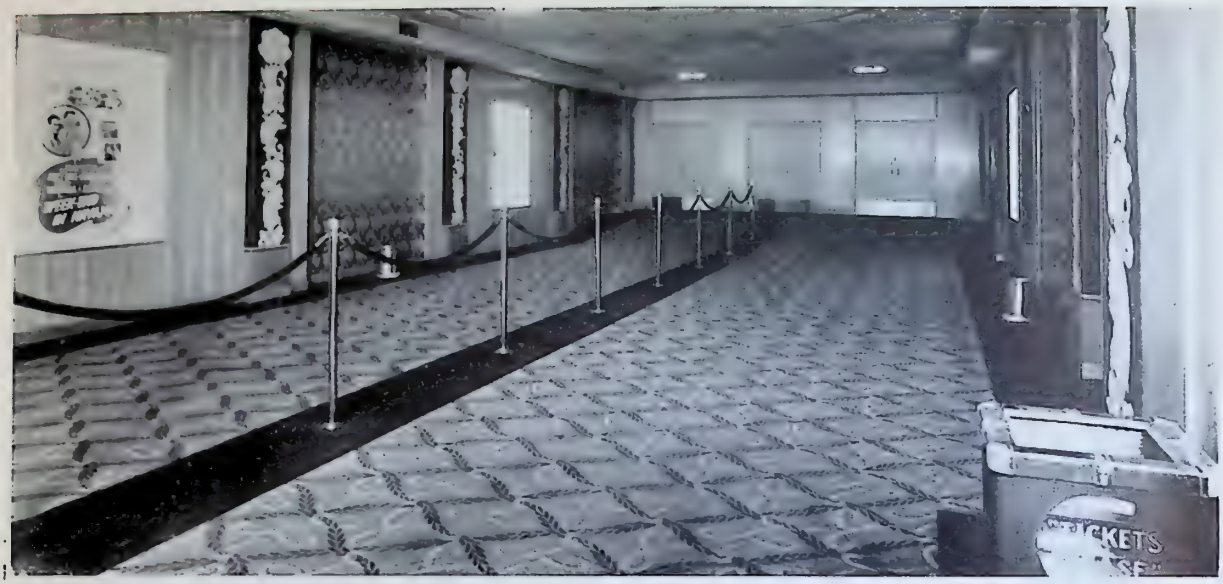


FIGURE 7—The recommendations are well illustrated in this photograph of the lobby of the Grand Theatre, Lancaster, Pennsylvania. Shown here is the line of removable posts, as well as the velour-covered ropes down the center which separate the incoming and outgoing traffic. Also seen is the wall treatment, with alternate panels covered with wood and fabric, with displays the lighting of which complements the general illumination. The walls have been paneled with Marlite pre-finished Prima Vera wood-veneer, with wood mouldings. The doors also have been similiarly covered.

The floor should be of double construction with insulation between. Insulation should also be provided for the rest of the box office.

The cashier's window should have a 3-inch diameter speak-hole, 5 feet 2 inches above the sidewalk, equipped with a speaking tube which can be purchased from any theatre supply house. The window must also have a 3-inch by 18-inch opening at the deal plate which should be provided with a standard closure for use when the box office is not operating and for inclement weather.

A deal plate should extend in front of the cashier's window approximately 6 inches and the entire width of the opening in the glass. A small ledge on the front of the box office either on one side of the window or directly below on which the lady patrons can rest their bags, and so forth, is also a desirable refinement and tends to expedite the sale of tickets during busy periods.

The Vestibule

It will always be necessary to provide a recess of at least 2 feet 6 inches from the building line to the first set of entrance doors so that the doors will not swing out over the public right-of-way, and, provided space is available, an open vestibule approximately 10 feet in depth from the building line to the doors is very advantageous. This will enable the designer to extend the marquee soffit and lighting over this space and will be found very expeditious in handling the patrons on busy days.

The walls of the vestibule should be covered with material which will stand the weather and require the least amount of maintenance such as marble, structural glass, porcelain enamel, or a good grade of face brick.

The floor of the vestibule in most cases will have at least a slight ramp or warp to join the levels of the lobby floor and the sidewalk. It should, therefore, be of some non-slip materials, such as terrazzo with an abrasive added, colored cement, or can be recessed for perforated rubber mats which have the advantage in inclement weather of removing some of the dirt, snow, and mud from shoes of the patrons before they enter carpeted areas. If rubber mats are used, they should be made in maximum sized sections of 3 feet by 5 feet for ease in handling. Between the mats provide metal dividing strips with the floor recessed between the strips to equal the thickness of the mats to be used. The mats come in ⅜- and ½-inch thicknesses and are available in all colors, and can be had in any pattern or overall design desired.

Before deciding to use perforated rubber mats in this area, the owner should consider the fact that since their primary function is to collect dirt, it will be necessary to take up the mats every day and clean them and the floor underneath. This requires a considerable amount of labor and consequently is a constant item of expense.

Entrance Doors

The entrance doors should have full length glass panels with a bottom rail of not more than 16 inches, covered on both inner and outer surfaces with metal or plastic kick-plates.

Doors and frames can, of course, be either of metal or wood, or the doors can be tempered plate glass. This treatment will permit an unobstructed view from the sidewalk and vestibule into the lobby. The tempered plate glass doors must necessarily be equipped with floor hinges and door checks. This equipment is more desirable for all type of entrance doors, although it is more expensive and not warranted in some situations. If regular butts are used with overhead door checks, be sure that had clearance of at least 6 feet and 6 inches is obtained under the check, and never use less than one and one-half pair of butts for each door. Most codes require each door opening to be 5 feet in the clear when the doors are in an open position, and in some cases the 5 foot clearance is required between hardware. Governing codes and enforcement practices should be checked for requirements.

Push bars on the lobby side, together with "hold open" devices should be installed on all doors, but pulls on the exterior or vestibule side should be installed on one pair of doors only—at the doorman's location. Dead bolts on all doors except one active leaf of the pair with outside pulls, which is used for the locking leaf.

If these doors have severe exposure in the winter months, they should be weatherstripped. This weatherstripping should be easily replaceable as it is subject to constant wear in this location.

If metal is used for door frames, doors, poster frames, box office and other exterior trim, it should be a specially treated material such as alumilited aluminum or stainless steel, which will not require daily care to keep it presentable.

Thresholds for entrance doors should provide for recesses for rubber mats (if any) on the exterior side and also for the necessary recess for the floor covering of the lobby.

Display Frames

The last but by no means the least important item of the theatre entrance is the display frames which are used to display the posters and still photographs promoting the picture currently on the screen.

The most commonly used poster is a standard size of 40 inches by 60 inches, and 30 inches by 40 inches are also available. The still sizes are 8 inches by 10 inches, and 10 inches by 14 inches.

The minimum requirements for exte-

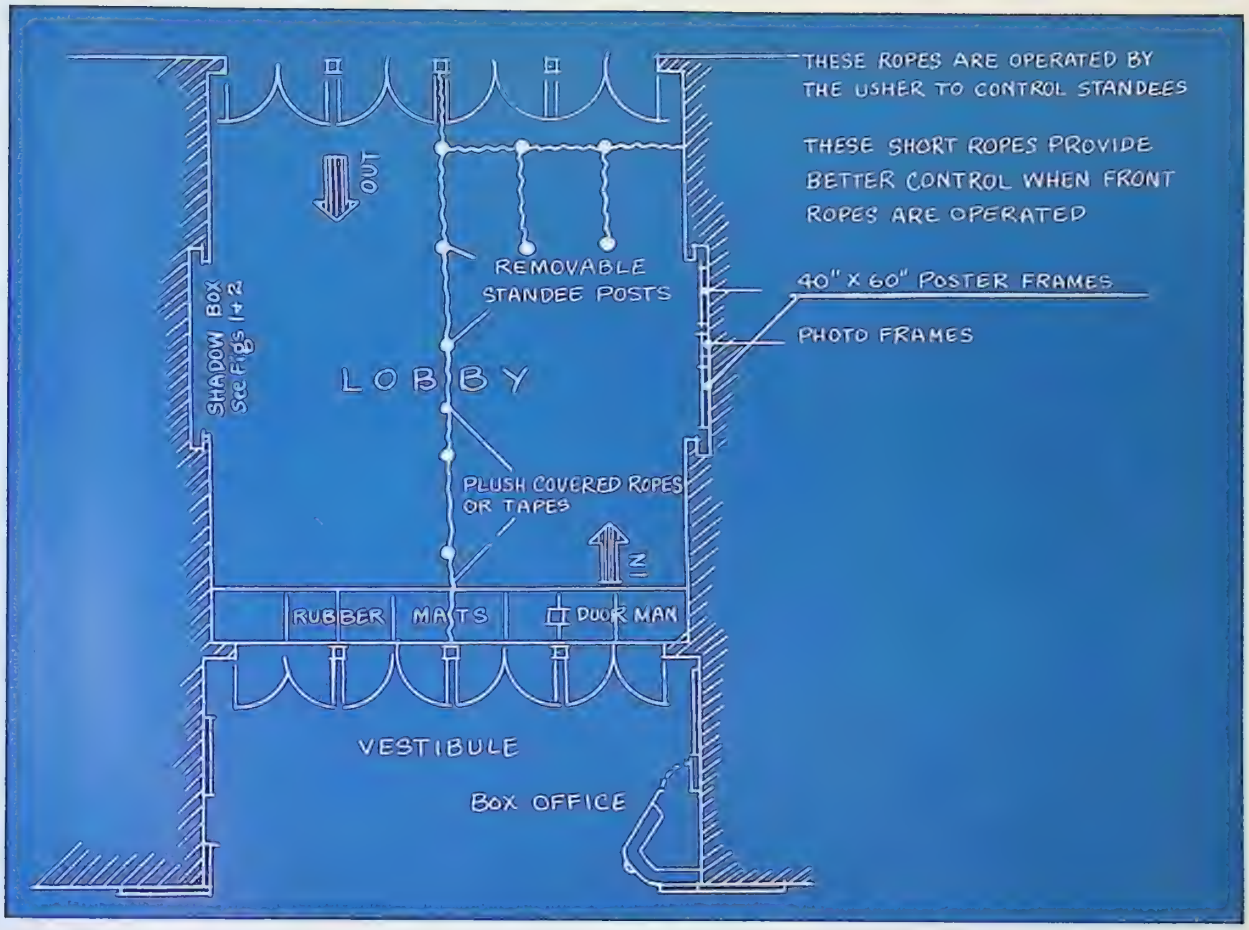


FIGURE 8—Sketch showing arrangement of standee posts and ropes in the lobby. The lobby is also used during periods of rush business for hold-outs and, therefore, must be planned for such use. The equipment for this area should include hold-out posts or rails for controlling crowds in orderly fashion, and to keep the exit passages clear for patrons who are constantly leaving the theatre. It is the practice to divide the lobby down the center with a row of removable posts, connected by velour-covered ropes. Ropes are also used to separate portions of the standees.

rior frames for a theatre of the size and type being discussed would be four frames for 40- by 60-inch posters, and two frames for stills. Combination corner frames with the 40- by 60-inch on the street front and the still frames on the returns can usually be worked out, with a 40- by 60-inch in each side wall of the vestibule. The arrangement of these depends entirely on the width of the front, location of the box office, and the depth of the vestibule. (See Figures 4 and 5.)

Frames for 40- by 60-inch poster require a clear glass size of 39 inches by 59 inches, the over-all size depending on the material of which they are constructed. Outside frames should all be glazed and the doors should be attached to the frames with full length piano hinges and equipped with two locks, one near the top and one near the bottom of the door to prevent warping. The back of the frame should be soft plywood and should have rabbeted members at top and bottom, and spring clips on the sides to hold the posters (Figure 6).

If the exterior display frames are directly under the marquee and if the marquee is lighted as it should be, no other lighting will be required. If this is not the case, provision must be made in the construction of the frames for concealed lighting for which the new slim-line fluorescent tubing is particularly adaptable. In case the frames are individually lighted they will require more depth from the glass back to the poster to properly conceal the light source.

Provision should be made in the masonry or other construction to recess all display frames, flush with the finish of the surrounding material.

THE MAIN LOBBY

The lobby and perhaps and adjoining foyer are the spaces which connect the exterior vestibule with the auditorium proper and are, therefore, the first places entered by the patrons and consequently the most impressive. These areas are also the most brilliantly lighted and therefore lend themselves to colorful and interesting decor. They are also the spaces which are subjected to the most wear and tear by the public. (See Figure 7.)

The designer should keep these facts in mind and choose his material and decorating scheme accordingly.

Most designers lose sight of the fact that the seating areas of the theatre are normally viewed by the patrons under very subdued lighting, and as a matter of fact in a continuous policy house, the only patrons who see the auditorium under fully lighted conditions are those who are seated before the start of the opening show and the corresponding few who stay until the end of the last reel. It is, therefore, good business to spend money for highly decorative effects in the lobby and foyer rather than in the auditorium proper.

This is not to be construed as recommending no decoration in the auditorium but does recommend restraint in the use of unnecessary lighting equipment and decorative effects which cannot be appreciated under reduced lighting. The decorative treatment of the auditorium will be discussed in a subsequent section.

The lobby is also used during periods of rush business for hold-outs and therefore must be planned for such use. Equipment for this area should include hold-out posts and ropes or rails for controlling crowds in orderly fashion, and to keep the exit passages clear for the patrons who are constantly leaving. (See Figure 8.)

It is good practice to divide the lobby down the center with a row of removable posts, connected by velour covered ropes, metal rails or a combination of both. The posts are supported in the

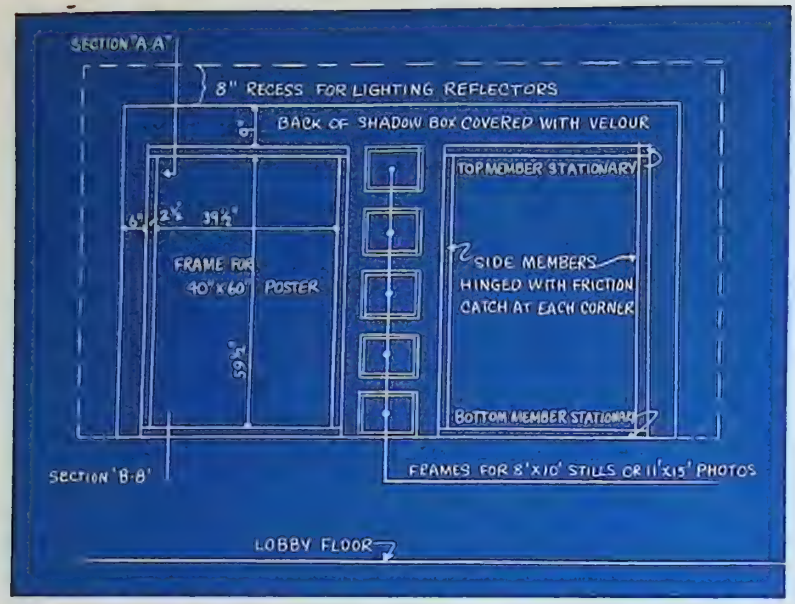


FIGURE 9—Elevation of a lobby shadow box. There should be the same number of display cases in the lobby as there are exterior frames. This results in double service from each poster. In some cases a panel over the doors may be used for display. These should be built with a backing of soft plywood to take thumbtacks and brads. Details of Section AA and Section BB are given in Figure 10.

metal floor sockets which are installed in the floor flush with the floor covering or finish floor. This equipment is manufactured by several specialty houses and can be purchased through theatre supply dealers. If the floor of the lobby is of concrete, the location of the floor sockets should be located before the concrete is poured. An ordinary five cent round carton of table salt makes a good form for the sockets and is easily removed after the concrete slab is set.

Display Frames

The lobby walls are the logical location for the interior display frames in which are displayed the posters advertising the next attraction. Since most theatres rent these posters, there should be the same number of display cases in the lobby as there are exterior frames. This results in a double service from each poster, one appearance in the lobby announcing the coming attraction and then another display in the outside frames for the present showing.

In some instances a panel over the doors at either end of the lobby may be used for display and announcing coming attractions, or for institutional copy. These should be built with a backing of soft plywood to take thumb-tacks or small brads for attaching the displays. The plywood back can be covered with a velour or other fabric in color to serve as a background for the displays. Provision should be made for lighting these panels with indirect lighting and reflectors or from the general lighting scheme of the lobby. (See Figures 9 and 10.)

The side wall display frames can be grouped together or be individual frames, and this arrangement is governed by the design.

The whole arrangement, number and type of display facilities for both the interior and exterior should be given considerable study by the designer in conjunction with the individual who will be in charge of the theatre operation.

If the operation of the theatre is such that there is a doorman or attendant in the lobby at all times, these frames do not necessarily require glazed doors. In certain situations it is almost impossible to keep the posters and stils from being defaced or stolen unless they are protected.

The lighting of interior frames can also be used as an adjunct to the general lighting scheme, creating bright spots of interest in the overall picture.

Floor Covering

The floor of the lobby can be of concrete covered with carpet, tile, marble or terrazzo. Whatever material is used, the effect should be warm and colorful. Carpet achieves this illusion and creates a feeling of elegance more than any other material.

If carpet is used on the lobby floor, there will be two spots which receive a great deal more wear than the rest of the area. These are at the doorman's station and immediately inside of the exterior entrance doors.

It is a good practice to provide for recessed rubber mats, non-slip asphalt tile, or other hard-wearing surfaces at these locations.

Lobby Walls

Due to the great amount of traffic through the lobby, and the hold-out patrons, the walls of this room are subject to considerable wear and should be covered with some hard-wearing material especially on projecting pilasters, corners, etc. Pre-finished wood veneer panelling is one of the most satisfactory materials for this location as it is not too expensive, requires practically no maintenance, and is available in a great number of different veneers and range of colors.

Fabric-covered panels for additional decoration can be used to great advantage for color and variety, and provides for a change in the decorative scheme.

Lobby Ceiling

The lobby ceiling, which will in most cases be of plaster, gives the designer an opportunity to use his imagination in form and color by the use of ornament, and lighting coves, or unique ideas in lighting, which can be obtained with the new lighting mediums now available such as cold-cathode tubing and slimline lamps. If money is to be spent in creating bizarre or unusual effects, (which are not out of place in a theatrical design) the lobby and foyer are the spots to splurge.

The ceiling lighting can be accomplished with coves and concealed lighting, with exposed tubes, or with fixtures. The designer should keep in mind that concealed lighting must be maintained, bulbs and tubes replaced and cleaned, and should provide for easy access and replacement.

Doors

The doors between the lobby and the standee space should be of the same number and size as the main entrance doors, but should be solid panels to exclude the daylight and lobby lighting from the standee space. These doors should be equipped with the same type of hardware as the entrance doors, that is, door closers, kick plates on both sides, push and pulls on all doors. If floor hinges are not used, one and one-half pair of butts to each door are required, and all doors should be equipped with hold-open devices. If the same floor covering is to be used on both sides of this line of doors, no thresholds are needed but if there is a change of materials at this point, either thresholds or metal strips will be required.

Candy and Popcorn Vending

At some location in either the lobby or the foyer where all patrons pass on their way into the seating areas, and preferably after they have passed the doorman, provision should be made for the installation of a candy counter and popcorn warmer, or at least niches for candy vending machines.

The dispensing of candy and popcorn has become "big business" and an additional source of revenue to the theatre. In fact the trend is now to provide a separate lounge which is brilliantly lighted and attractively decorated for the sale of popcorn, candy, cold drinks, and the like. Some theatres are even installing equipment for displaying and selling frozen foods as a convenience to the lady matinee patrons.

The overall dimensions of a popcorn warmer are approximately 4 feet high by 3 feet 6 inches wide, and 2 feet and 1 inch deep, and requires at least 18 inches clearance in the rear. The usual candy counter is 3 feet 6 inches high, 1 foot 8 inches deep and a minimum length of 4 feet, with three shelves for displaying candy and storage space below. Provision should also be made for cabinets to store stock so that it is easily accessible to the attendant in charge. These should be metal lined with tight-fitting doors which can be locked. The designer should consult with a repre-

sentative of the candy vending company who will service this particular theatre. If space is available, the counters should be set back from the path of the patrons to eliminate interference by those who stop to make a purchase. Electric outlets for lighting and heat for the popcorn warmer should be provided, also for lights in the candy case.

If the candy case is located directly adjacent to the popcorn warmer, provide for heat insulation between the two units.

When space is not available for the more elaborate installation as described above, provision should be made for niches for candy vending machines. The minimum dimensions for niches to accommodate two machines are 5 feet wide by 1 foot deep by 5 feet and 6 inches high. Provisions for electrical connections to each machine are required.

THE STANDEE FOYER

If the entrance lobby is at right angles to the standee foyer, the distance from the inner set of lobby doors to the standee rail and last row of seating should be as great as possible consistent with a good plan, the limitations of the number of seats desired, and the size of the plot. In certain layouts the lobby will lie parallel to the standee foyer and the seat rows, and may really be a continuation of the standee foyer or it may be parallel and lie between the auditorium proper and the lot line.

In any event the retiring rooms and toilets, stairs to mezzanine, if any, should be accessible directly from this space, that is, inside the line of doors separating the lobby and the doorman's station from the seating areas. This arrangement provides for the best control both in a mezzanine-type house, and also in a one-floor or a stadium-type house, with fewer personnel. If possible, the toilets and retiring rooms should be located on the orchestra floor level, but in many cases it will be necessary, due to the limitations of space, to locate these facilities in the basement or on the mezzanine level.

If such is the case the basement location is generally preferable, and if the house has mezzanine seating, a smaller set of toilet facilities should be provided on that level. This is especially desirable if the policy of the house has different prices for the mezzanine and orchestra.

Every location and local requirement will necessitate individual planning for this portion of the theatre and the above are simply suggestions of items to consider when the layout is being made.

At some location adjacent to the standee foyer or lobby, there should be provided a janitor's closet with hot and cold water supply and slop sink. This closet should be equipped with shelves for janitor's supplies, and will also be a convenient location for the electrical house and sign panels.

At least one, and in some cases two, drinking fountains should be provided in this area. The drinking water coolers can be located in the janitor's or other closets, with the remote bubblers exposed. The floor area immediately below the drinking fountain should be recessed in the shape of a semi-circle of approximately 4 feet diameter for a rubber mat, with a metal division strip between the carpet and the mat. This will prevent the constant wetting and subsequent rotting of the carpet at these locations, as you can be sure that this condition will occur due to the vagaries of the bubblers, the manipulation of the younger patrons and the playfully minded older ones.

The wall behind the drinking fountain can be treated as a decorative feature, using mirrors or other type of easily cleaned decorated panel. A shaded light which will not interfere with the picture but will illuminate the fountain should be provided. In houses which anticipate the patronage of the younger clientele, it is sometimes advantageous to provide a carpeted covered stepping block for their use at one side of the drinking fountain.

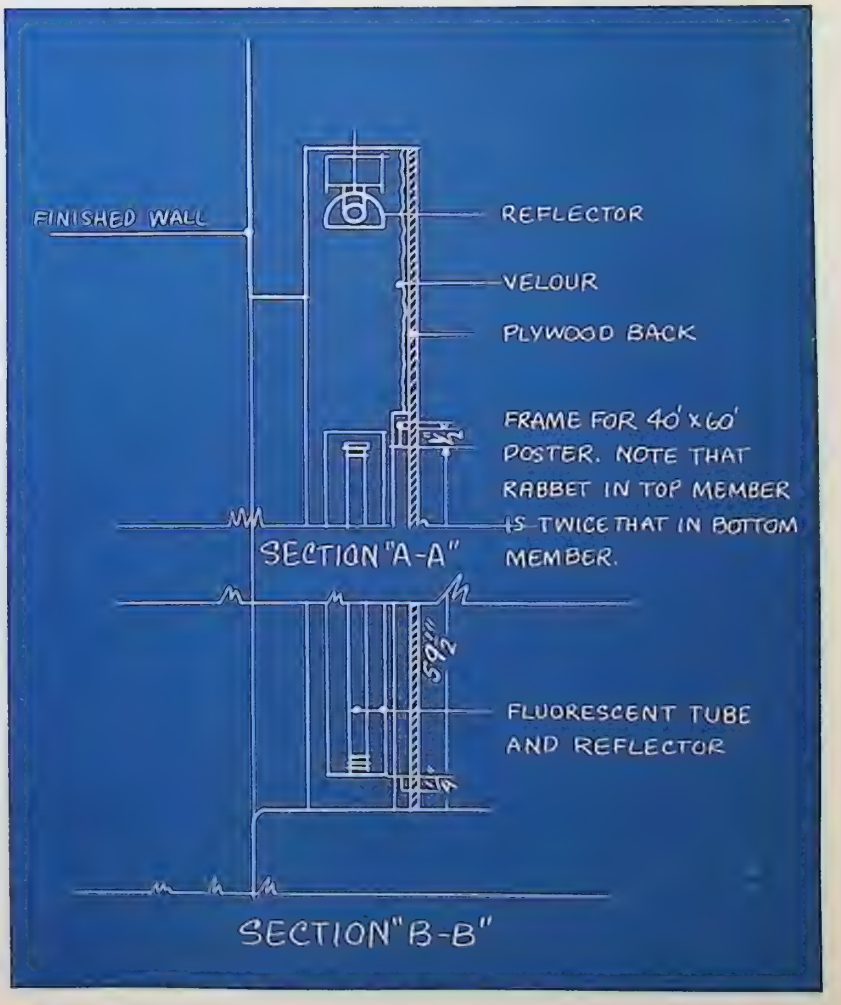
It is imperative that the floor of the standee foyer be carpeted to eliminate traffic noise in this area which would interfere with the comfort of the seated patrons. If the area has a low ceiling, acoustical treatment to lessen the noise is also desirable unless the standee rail is provided with a solid screen to the ceiling.

Standee Rail

The standee rail which serves the primary purpose of a barrier dividing the seating area from the standee foyer can also be designed for concealed lighting on the foyer side and also for return air grilles for the ventilating and cooling system. In the latter case the rail should be supported by angle iron frames securely fastened to the floor or imbedded in the concrete slab. (See Figure 11.) To give the rail further stability and to provide the necessary clearance for concealed lighting and openings for ventilation ducts, the face of the rail on the seating side can be sloped to conform to the slope of the chair backs. This will require floor space which is not usable for any other purpose and would otherwise be a collector of dirt and refuse, and a difficult place to keep clean. The base of the rail in the foyer side should have a toe recess about 4 inches in depth.

The standee rail proper should be 4 feet above the foyer floor with a top 12

FIGURE 10—Details of Section AA and Section BB, as indicated in Figure 9. Provision should be made for lighting poster frames with indirect lighting and reflectors or from the general lighting scheme of the lobby. The lighting of interior frames can also be used as an adjunct to the general illumination plan, creating bright spots of interest in the over-all picture of the lobby of the theatre.



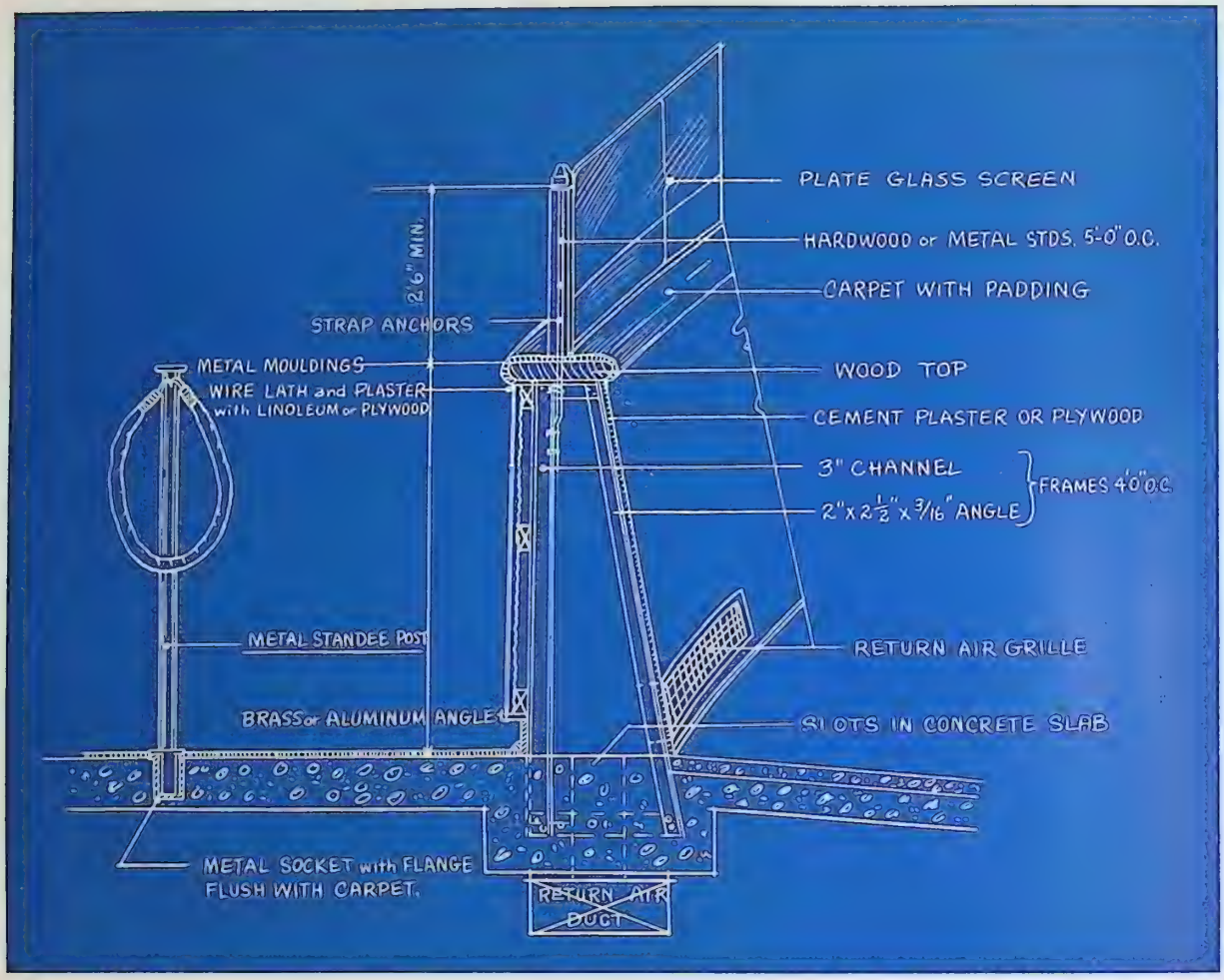


FIGURE 11—The standee rail, that serves the primary purpose of a barrier dividing the seating area from the standee foyer, can be designed for concealed lighting on the foyer side and also, on the auditorium side, for the return-air grilles for the ventilating and air-conditioning system. In the latter case, the rail should be supported by angle-iron frames securely fastened or imbedded in the concrete slab. The base of the rail on the foyer side should have a 4-inch recess for toe space A plate glass screen is, or can be, mounted atop the standee rail.

to 14 inches in width. Since this top is subjected to extremely hard wear, a finish of paint or varnish will not stand up, and in many instances has been covered with the same leatherette or material used for the seat covering, over a padding of Ozite or with a piece of plain colored carpet. If an angle iron frame as described above is used, the vertical surfaces can either be plywood or cement plaster on metal lath. The standee rail can, of course, be constructed of solid masonry with both faces vertical or can be framed in wood. In any case the construction and anchoring should produce a substantial rail which will resist the wear and strains of constant traffic.

Whether or not a screen of some kind should be placed on top of the standee rail will be determined by the layout of this portion of the theatre. The screen serves several purposes, such as preventing annoyance by standees to patrons in the back row of seats, elimination of noise from the standee foyer area, the prevention of drafts, and the screening of daylight and lobby lighting from the screen when the doors are open.

In most every case, a glass screen on top of the standee rail to the height of at least 6 feet will be found effective in lessening the annoyance to the seated patrons, still allowing the standees to see and hear the picture. It will be found that if standees do not annoy the other patrons too much, the fact that they can absorb part of the picture while waiting to be seated, will materially increase the turnover of the house on busy days when seats are at a premium.

If the standee rail is quite close to the front entrance doors and there are only two sets of doors between it and the sidewalk, then a full height screen with doors at the aisles is indicated. The screen in this instance can be solid wood, masonry or plaster on wire lath and furring, or it can have glass panels which can be covered on the seating side with quite heavy fabric drapes hung on tracks with drawstrings for easy operation from the aisles. These drapes will be found necessary in most instances to prevent reflection and distortion of the sound in the seating portion.

Whether or not a full height screen is used will, of course, influence the decoration and the lighting of this space. If a low screen is selected, the standee foyer actually becomes a part of the auditorium. The lighting level and decorative scheme will be a continuation and will conform more or less with the the scheme of the auditorium proper. A full height screen which entirely separates the standee foyer from the orchestra creates a separate room which can be treated, so far as decoration and lighting are concerned, without necessarily being influenced by the decorative scheme of the auditorium. If the plan can be developed to include niches or open spaces as part of the standee foyer for furniture groups, either movable or built in, but which will not interfere with the paths of incoming or outgoing traffic, the patrons will appreciate the accommodations and it will add greatly to the general decor of this area.

Standee Posts

Whether or not the local police or fire department enforce any regulations as to standees in the theatres, provisions must be made to control them and to

have clear exit space for outgoing patrons during normal operation, and also complete control in case of a panic. To do this, provision must be made in the plan for the layout of the removable standee posts and the installation, preferably during construction, of the sockets for these posts. In some cases standees will be held only at the rear of the center bank of seats or the two center banks in case the seating is laid out with a center aisle. The standees are then fed into the aisles as fast as the seats are empty and the aisles cleared. It is sometimes desirable to provide for two cut-off ropes, the second one about 5 feet behind the first, to serve as a lock and to be operated by the usher when necessary to prevent the crowd from getting beyond control.

The theatre designer will find that any experienced theatre manager or operator have some very definite and very efficient ideas regarding the method of controlling hold-outs, and the arrangements of the barriers, and should be consulted in this regard.

The construction of the standee posts and rails or ropes should be thoroughly streamlined with recessed eyes and without sharp projections to catch and tear the patrons' clothes. In some cases it may be required that the connecting ropes be equipped in center with a friction connecting link which will separate when sufficient pressure is applied in case of emergency. These would not usually be required unless the ropes cut off the line of travel to the emergency exits.

The short feed ropes which are operated by the usher to permit the standees to proceed to the seating area should be located a sufficient distance from the aisle to allow the usher on duty to operate without interfering with the aisle traffic. (See Figure 12.)

THE AUDITORIUM

The auditorium is the principal room in the theatre so far as the public is concerned and is the space in which the patrons spend the greater portion of their time while attending a show. It, therefore, holds that this room should be designed, constructed, furnished and decorated to provide the maximum amount of comfort and pleasure possible for these customers. There is no question that many people will attend a theatre which has these attributes even though the picture currently showing may be inferior, in their opinion, to the one on view in a competitive house, in which they feel uncomfortable, for one reason or another.

Auditorium Plans

There are four basic plans to consider in the design of a motion-picture theatre, namely: (1) the single floor plan, (2) the orchestra and mezzanine plan, (3) the orchestra and balcony plan, (4) the stadium plan.

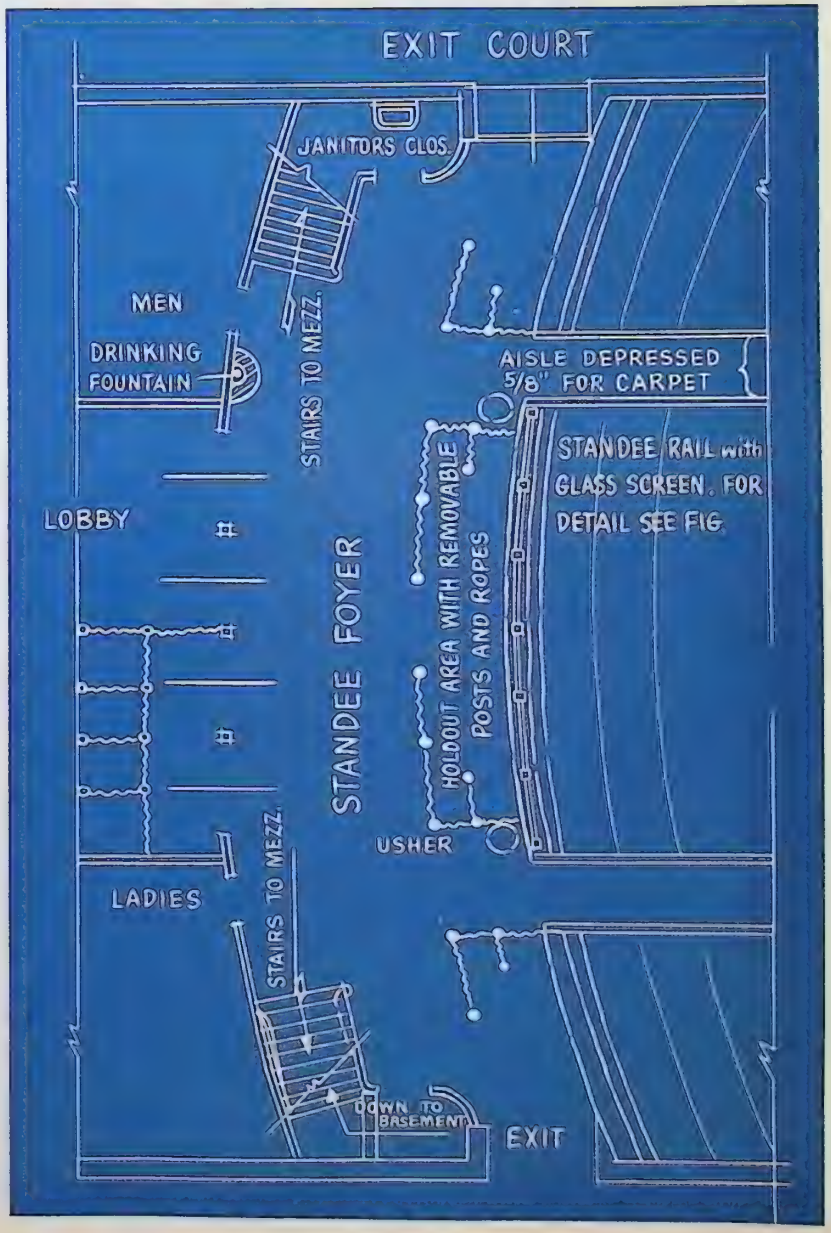
In a theatre of 1,500 seats or under, a large balcony would rarely be required and the most economical plan would probably be one which would have 1,000 to 1,200 seats in the orchestra, and the balance in a small mezzanine. Since the seating area in the mezzanine overlaps the seating area of the orchestra, there is a definite saving in the side wall and the roof construction. This type also results in more seats nearer the screen than in either the one-floor house or the stadium type.

The stadium plan of course has advantages in certain cases depending on the site and the number of seats required, and also has some advantage in requiring less personnel for the operation. As against these advantages it results in the greatest viewing distance from the rear seats and also the longest throw from the projection booth.

When the seating capacity of the theatre is over 1,000 seats, the most economical plan is the one floor and mezzanine. The orchestra floor in such a house will in most cases have sufficient capacity for weekly matinees while the mezzanine can be closed off and only used when business requires the additional seating capacity.

The retiring rooms in this plan should be located on the orchestra floor level for proper control with the least personnel. If the stairs from the mezzanine are so located as to lead directly from the front of the aisles to the foyer, and the highest seat bank is not more than 15 feet above the foyer, then under most codes no fire escapes or fire towers are required from the mezzanine, and the control of the public is very much simplified for the manager and his staff.

FIGURE 12—Sketch showing layout for hold-out posts in the standee foyer. The short feed ropes should be located a sufficient distance from the aisle to allow the usher on duty to operate them without interfering with the aisle traffic. Standee posts and rails (or ropes) should be streamlined with recessed eyes and no sharp projections which might catch and tear the patrons' clothes.



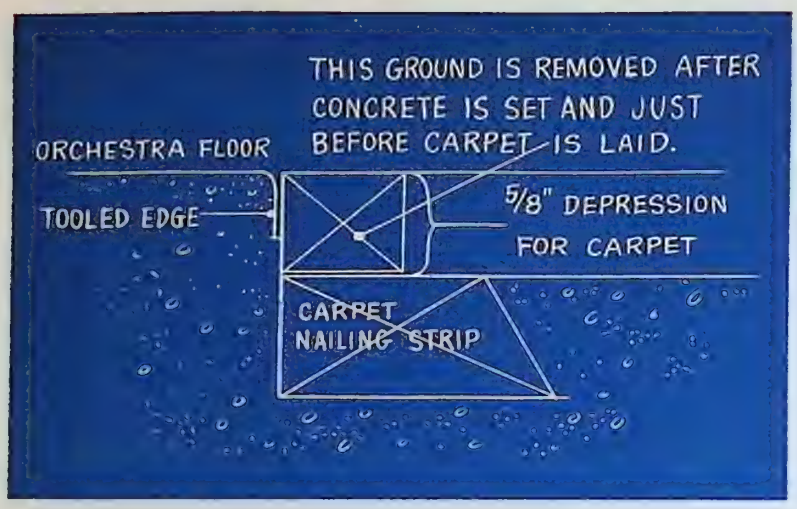


FIGURE 13—When the cinder fill is properly leveled and compacted, the aisles should be located and the carpet strips and grounds installed to proper floor slope. If grounds are used, these will provide screeds for both the floor and the aisle, also provide a protection for the edge of the carpet depression until such a time as the concrete is cured. Screeds are only temporary devices to save time and labor.

Orchestra Floor

As stated earlier, in order to provide for drilling clean holes for the expansion shields used to secure the chair standards, the top 2 inches of the concrete floors in the seating area should be composed of a mixture of one part of cement to one part of sand, and two parts of fine grit. This topping should be poured integrally with the rough slab which should be regular 2,500-pound concrete with temperature reinforcement both ways. If this slab has a structural function then, of course, it will be so designed and the necessary thickness and reinforcement computed. If the slab rests on the earth and is over areas that have been recently filled, then the slab should be properly reinforced to be self-supporting over such areas. A well compacted, 6-inch layer of cinders or gravel should be installed immediately under the slab for drainage unless the nature of the soil is sandy and will supply the necessary drainage.

When the cinder fill is properly leveled and compacted, the aisles should be located, and the carpet strips and grounds installed to proper floor slope. If grounds as shown in Figure 13 are used, these will provide screeds for both the floor and the aisle, also provide a protection for the edge of the carpet depression until such a time as the concrete is cured. When the aisle screeds are located and installed, screeds should then be installed between the aisles to the exact curve of the seat rows, and at the elevations given for the floor. These screeds will only be temporary and will be removed before the adjoining portion of the floor is poured.

A hardener should be mixed in the floor topping which can also be colored if desired. The hardener, however, is mandatory to prevent dusting of the floor.

As soon as the concrete is sufficiently set, it should be covered with a layer of heavy kraft paper or a layer of sand, and kept damp for at least seven days to produce the proper curing. The covering should remain on the floor until the plastering and other heavy work is finished in order to prevent chipping and discoloration.

Wall Piers

If the interior design of the auditorium contemplates a side wall treatment which is not to be interrupted by columns or pilasters, then the inside of the enclosing theatre wall should be on a line with the inside of the masonry piers or the fireproofing of the steel columns. This will save the cost of the furring necessary if the piers or columns project beyond the face of the inside wall.

Wainscot

A wainscot of hard wearing material should be installed all around the auditorium walls, but since such material will reflect sound, it should be kept down to average shoulder height or approximately 5 feet from the floor. Wainscoting should be installed on these walls, even if no side aisles are used.

The wainscot can be marble, terrazzo, linoleum, or wood, but the most practical and the cheapest is a wainscot of well-troweled, smooth cement plaster which can be painted.

Since the finish wall above the wainscot will, in most cases be treated acoustically, and will therefore be 2 inches away from the rough masonry, it will be necessary to either furr out to bring the finish wainscot in line with the finish above, or a compensating moulding can be designed to overcome this distance. (See Figure 14.)

Scaffolds

The schedule of construction should be such that the floor can be installed and cured before the scaffolding for the ceiling is erected. This scaffold will also be used for the painters and for hanging the auditorium draperies. Therefore, it will not be ready for dismantling until a few days before the theatre is ready to open. It is, of course, possible to use a hanging scaffold in which case there will be no intereference with the pouring of the floor or the installation of the seating.

If such a scaffold is used, it should be suspended by steel cables from the roof structure and the added load imposed on the roof framing should be recognized in the structural design. Flanged sheet metal thimbles about 2 inches in diameter and 6 inches in length should be placed around the cables to be plastered in later with the bottom flange flush with the finished ceiling. To each thimble should be attached by means of a flexible chain or wire, a flat metal disk which will hang below the ceiling and can be painted to match the surrounding ceiling decoration. After the scaffolding is removed and the cables pulled up in the attic space through the thimbles, the disks can be pulled flush with the ceiling covering the holes and secured by means of the wire. The wire cables should remain attached to the roof structure and neatly coiled and greased for use when redecoration is required.

Ceiling Construction

The ceiling of the auditorium will, in all probability, be plaster on metal lath attached to furring which in turn is suspended from the roof structure. This ceiling, unless it is properly constructed, can be a source of danger to the patrons seated below and consequently a great responsibility of the theatre management.

The main members of the furring should be 1½ inches by 1½ inches by 3/16-inch steel angles or 2-inch rolled steel channels, bent to the contour of the ceiling, hung by means of 1-inch by 3/16-inch flat iron straphangers, 4 feet on centers. These hangers should be securely attached to the structural roof members by means of special clamps and stove bolts, and to the runners by means of bolts through holes punched in the hanger and the angle. (See Figure 15.) Special care should be exercised to be sure that all these iron straphangers are under tension and carrying their portion of the load after the plastering is completed. Across the main furring angles or channels, ¾-inch cold rolled channels, 12 inches on center are attached by means of approved wire clips. The metal lath is then attached to the channels using wire ties. This lath should weigh 3.4 pounds to the foot and should be treated for rust prevention.

All hangers and furring members should also be dipped in a rust preventive paint before being stalled or thoroughly painted after installation.

The plaster will be applied in three coats, namely, the scratch coat, brown coat, and finish or white coat. The scratch coat is of the utmost importance as it is the one which anchors the plaster ceiling to the metal lath. Sufficient pressure must be applied by the mechanic to force the scratch coat between the voids in the lath so it will mushroom out and completely enclose the lath on the top side as well as the bottom. The brown coat is next applied after the scratch coat dries out sufficiently and in no place should it be necessary to apply more than a thickness

of ¾-inch of this coat to bring the surface for the finish coat to the proper lines. If more plaster is necessary, the furring has been improperly located and too much loading is being put on the bond between the plaster coats, which may result in falling plaster at a future time and injuries, lawsuits, and so forth. The finish coat is next applied, and this can be either a white putty finish or a sand finish, according to the wishes of the designer and the decorator.

If pre-cast plaster decorative mouldings or features are to be used, these must be securely tied through the plaster coat to the furring behind in addition to being "stuck."

The suggestions contained in the last few paragraphs regarding the proper installation of suspended plaster ceilings are only a review of rules which have been developed for good workmanship in any structure, and a reliable plastering contractor would not do otherwise. They are recalled here only because an auditorium ceiling can be a great potential hazard if not properly constructed.

Ceiling Decoration

The auditorium ceiling has always seemed to be a challenge to all architects and designers, and an opportunity to give their imagination, or ability to adapt classic designs, free play, using decorative mouldings, lighted covers, domes, and panels. This type of design looks nice on the drawings and in the photographs, but is rarely discernible to the audience and represents an unnecessary expenditure to the owner which will give him very little, if any, return.

A certain amount of such decoration or a ceiling with different levels is sometimes justified but too much is a definite waste of money. In fact the present trend in redecorating the older theatre ceilings which are covered with ornamental plaster, is to paint the decorative motifs out rather than to accentuate them with gold leaf or dutch metal and varied colors.

A smooth plaster ceiling can be relieved by the decorator in paint, with bold but simple decorative motif, perhaps tying together, and more or less camouflaging the air diffusers which will in most cases protrude below the finish ceiling.

Exit Door Sills

The sill of the exit openings should be raised above the level of the sidewalk or the exit court by means of a ramp in the recess referred to above and perhaps a step at the building line to prevent water from flooding rains to flow onto the orchestra floor.

Since the aisles or other areas immediately adjacent to exit doors will be carpeted, it is necessary to make provision at these points for the carpet and padding.

The recommendation for these sills is an angle set securely in the concrete with the vertical leg projecting ⅝ of an inch above the orchestra floor level. (See Figure 16.)

Exit Door Alarms

Exit doors are always a source of annoyance to the theatre management, especially those opening into an isolated exit court, as they are a temptation to certain individuals who wish to enjoy the show without the customary procedure of purchasing a ticket.

Due to the panic hardware required for securing these doors, they are more easily opened from the outside than a regularly locked door, and this is soon discovered and taken advantage of by gangs of the younger set in the neighborhood. If the doors are fool-proof from the outside the procedure is for one of the gang to pay the admission and then stealthily unlatch the doors for the rest of the gang to sneak in. It is not the usual thing for the theatre to have a sufficient number of ushers on duty successfully to counteract this practice. Therefore, it is recommend that an electric alarm system be installed connecting these doors with a signal in the manager's office which will give instant notice when these doors are being tampered with.

Emergency Exits

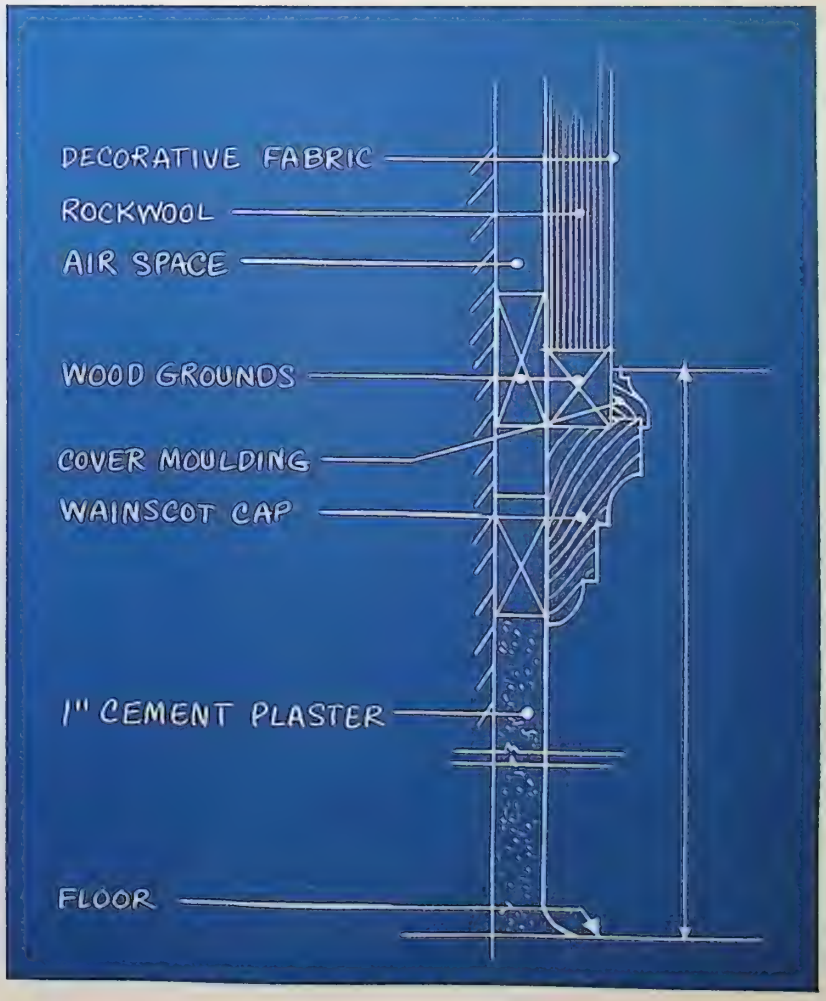
At least two emergency exits on each side of the theatre will be required in most cases for the orchestra level. These will be located at the rear of the seating area, and at the front near the stage. If the orchestra has sufficient rows of seating to require a cross aisle, an additional exit will be required at each end of the cross aisle.

Unless a wider opening is stipulated by the governing code the clear opening of these exits should be 5 feet which will require a masonry opening of about 6 feet and 4 inches, depending on the thickness of the doors. The doors and frames for these openings should either be metal or metal covered, and should bear Class C Underwriters' labels. They should be equipped with approved standard panic bolts and one and one-half pair of butts to each leaf.

Door closers are also desirable but not absolutely necessary, unless required by the underwriters or fire marshal due to a hazardous occupancy of an adjoining building. Astragals may be used on one leaf to close the center opening, in which case hardware is available that will permit the proper closing of the doors without interference.

To prevent drafts on the patrons seated close to these doors, as well as

FIGURE 14—Since the finish wall above the wainscot will, in most cases, be acoustically treated, and will, therefore, be 2 inches away from the rough masonry, it will be necessary to furr out to bring the finish wainscot in line with the finish above, or a compensating moulding can be designed to overcome this distance. The wainscot, if desired, can be cheaply made of smooth cement plaster.



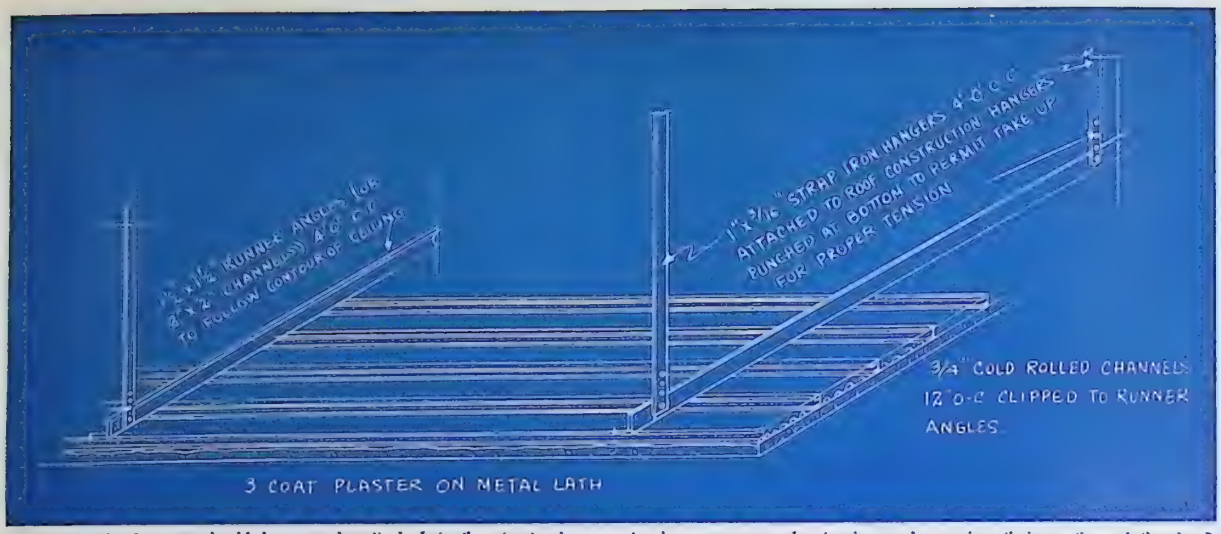


FIGURE 15—The hangers should be securely attached to the structural roof members by means of special clamps and stove bolts, and to the runners by means of bolts through holes punched in the hanger and the angle. Special care should be exercised to be sure that these iron straphangers are under tension and carrying their portion of the load after plastering is completed. Across the main furring angles or channels, ¾-inch cold rolled channels, 12 inches on center are attached by means of approved wire clips. Metal lath is attached by wire ties.

to conserve heat in the winter and the refrigeration load in the summer, these openings should be provided with weather stripping.

The exit doors should be sufficiently recessed inside the building lines to prevent them from swinging over the public way or into the line of travel of the exit courts.

Exits From Upper Levels

If the auditorium is a stadium type, mezzanine, or balcony, it may be required to provide emergency exits from an upper level. These exits may be necessary leading from the highest level, at the level of the cross aisle if the stadium or balcony contains more than 15 rows of seats, or from the lowest level. In instances where there are larger balconies, these exits on each side may be mandatory. These requirements vary with the local codes but in any event sufficient emergency exits should be installed to provide for safe and quick exit from these areas. These exits will lead either to exterior fire escapes or to enclosed fire towers, leading directly to the outside grade levels.

Fire towers should be enclosed with 4-hour masonry walls and have openings closed with approved fire doors.

In the case of fire escapes, it may be necessary in order not to restrict the exit courts, to turn the fire escape back inside the building and continue to the grade level as a fire tower.

Some codes will require that all exterior fire escapes be protected by a fireproof roof covering. Corrugated iron is generally acceptable for this purpose. In any event the construction should be ice-proof, by constructing the treads of square-shaped iron bars with one edge turned up, which method will cause the ice to crack off when stepped on.

Counter-balanced construction to prevent access from the ground level for the lowest flight of the fire escape will eliminate nuisance on the fire escape and tampering with the exit doors.

Each fire escape will require a platform at the level of the exit door sills and these should be so constructed that the exit doors, when opened, will not interfere with the path of travel. Widths of platforms and stair runs of fire escapes are generally stipulated by the local or state codes, or both, and vary with the number of persons they are designed to serve. In no case, however, should the clear width of the platforms and the stair rims be less than 3 feet.

Seating Layout

The most important item in this category is, without a doubt, the seating.

Several important factors enter into the seating installation to achieve the best results, namely, the type, construction, and upholstery of the chairs, the width of the seats between the arms, their spacing back to back, the slope of the floor, and their arrangement in the rows to afford good sight lines and the minimum interference in the viewing of the picture.

The standard theatre chair measures 19, 20, 21, or 22 inches from center to center of the arms. Unless the theatre management wishes to feature extra wide seats, the average installation will use 20-inch chairs, but it will be necessary to use 19-, 21-, and 22-inch chairs in order to produce straight aisle lines and to keep the aisles of legal width as required by the different codes which govern.

The variation in widths can also be distributed to effect a stagger in any two consecutive rows to improve the sight line. This is especially desirable in the bank of seats in the center portion of the auditorium.

Nineteen-inch seats should be used sparingly, and if the seating layout is properly made, these can be largely confined to the front rows which are most frequently occupied by children.

Thirty-two inches from back to back of the seats is the minimum that should be used for orchestra seating, and 33 inches from back to back for the mezzanine or balcony.

The seat rows should be laid out on arcs of concentric circles. (See Figure 17.) The location of the center of these circles will be determined by the width of the house, location of emergency exits, and so forth. The orchestra floor along each of these concentric arcs will be level in order to maintain the same sight line for all seats in the row.

In order to lay out the orchestra floor to the proper elevation, it will be necessary that several variables be taken into consideration.

Floor Elevation

The elevation of the floor at the last row of seats will be determined primarily by the established elevation of the curb and the sidewalk at the front entrance. The level at the last row can, however, be adjusted to a limited degree by ramping the floors in the spaces between the sidewalk and the standee rail. These ramps should not be too steep and are usually limited by the governing codes, but should never be greater than 1 : 12. In some cases, when the proper elevation at the last row cannot be attained completely by the use of ramps, it may be necessary to raise the last two or three rows above the level of the aisles, employing steps for entrance into the seat banks. This method should be used only as a last resort, and the steps resulting must be well lighted by means of steplights to prevent accidents.

If the theatre occupies a corner lot with required emergency exits on the side street, the fixed elevations of the curb and the sidewalk at these exits will have to be met as nearly as possible by the curve of the orchestra floor. In many cases it will be necessary in order to accomplish this, to make use of slight ramps and warps in the side or cross aisles, or in some severe cases the use of steps at the exits, which constitute a hazard in case of a panic and should be avoided. This is another

situation that is generally covered by code and should be checked carefully in that relation.

Where the emergency exits feed into an exit court, the level of such a court can be adjusted by means of ramps to meet the level of the exit door sills. Such courts, however, should follow as closely as possible the general outside grade. This is advantageous for reasons of construction cost and to avoid an exit court several feet below the natural outside grade, which will become filled with snow and ice in the winter, and be difficult as well as costly to keep clean and passable at all times.

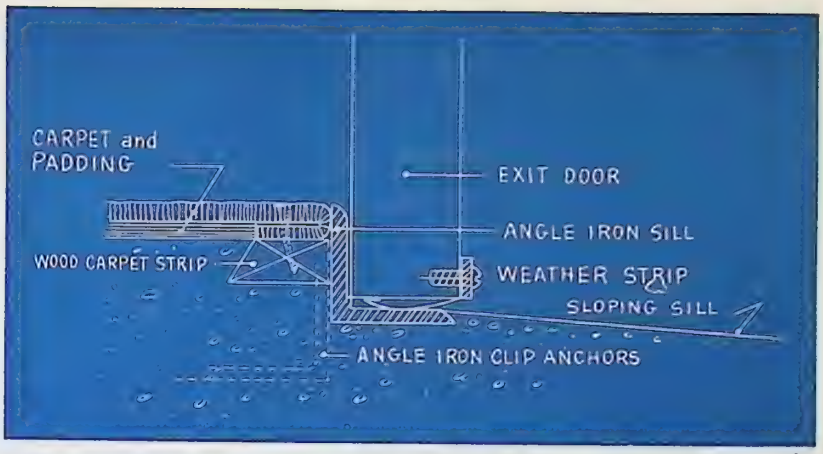


FIGURE 16—The sill of the exit openings should be raised above the level of the sidewalk or exit court by means of a ramp or, perhaps, a step at the building line. Since the aisles immediately adjacent will be carpeted, it is necessary to make provision for the carpet and padding the recommendation for these sills is an angle set securely in the concrete. Doors should be weather-stripped.

Picture Elevation

The next variable to consider in determining proper floor slope is the elevation of the bottom of the picture and the elevation of the stage or platform. The proper height of the bottom of the picture above the stage or platform is from 18 to 24 inches, which gives an opportunity for the installation of the bottom masking of the picture sheet. The bottom of the picture can be located at almost any height in relation to the elevation of the floor at the last row, but the elevation of the floor at the first row will be fixed at a distance of 5 feet to 5 feet and 6 inches below the bottom of the picture.

With an assumed elevation of the bottom of the picture, and the elevation of the floor at the first row fixed in relation to this figure, the sight line from the bottom of the picture over the heads of the seat occupants in the first row to the eye height of the occupants of the third row can be determined and consequently the elevation of the floor at the third row. This procedure is then repeated determining the sight line from the bottom of the picture over the third row heads and meeting the eye line of the fifth row. The average height of the eye of a seated person is 3 feet 3 inches and the average distance from the eye to the top of the head is 4½ inches. By repeating this process for every second row until the level of the last row is determined, the proper curve of the floor will be obtained for variables which have been assumed.

Should the curve thusly determined fail to meet the fixed elevations, such as the side emergency exits and the elevation of the standee foyer at the standee rail, it will be necessary to either raise or lower the assumed elevation of the bottom of the picture and start over, repeating this process until a curve results which will most nearly meet the requirements.

The process of figuring the floor curve may be reversed starting with the approximate required elevation of the last row and figuring the line from the eye height of these seats over the head height of the second row in front and continuing to the first row.

The preliminary trials may be made graphically but, due to the great probability of accumulated errors in this method, the final elevations of the curve should be figured. In this connection, considerable time will be saved if the elevation of the stage is taken as plus or minus no feet, no inches.

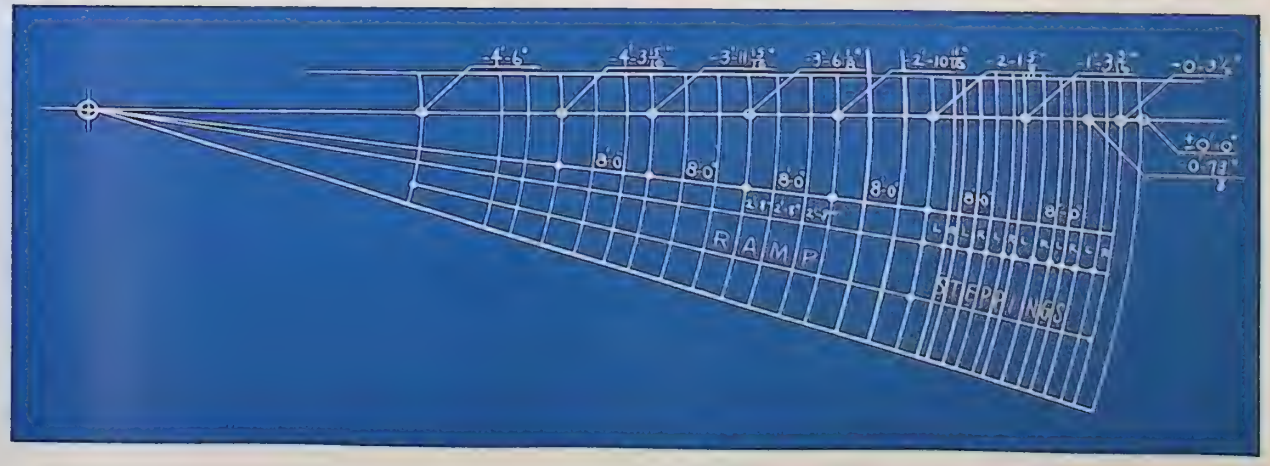
Floor Curves

Depending on the relation between the elevation of the bottom of the picture and that of the floor at the last row of seats, varying types of curves will result, but if the calculations are correct the sight lines resulting will be satisfactory.

The usual curve is one which has the steepest inclination at the rear, gradually diminishing towards the stage. Another might be a reverse curve with the lowest point somewhere approximately two-thirds of the distance between the last and first rows, or it may result in a curve where the last row and the first row are at approximately the same elevation with the lowest point of curve somewhere near the center row. An extreme case can also result where the slope of the curve is entirely reversed and although such a curve will produce the proper sight lines, it is not recommended.

In this connection attention is called to the fact that seat standards are available, and will be supplied by the seat-

FIGURE 17—Orchestra floor seating layout, showing steppings in the rear rows. (Not drawn to scale: figured elevations are not necessarily typical.) The seat rows should be laid out on the arcs of concentric circles. The center of these circles will be determined by the width of the house, locations of emergency exits, and so forth. The orchestra floor along each of these concentric arcs will be level in order to maintain the same sight line for all the seats in the row. In order to lay out the orchestra floor, several variables must be considered to establish the proper sight lines.



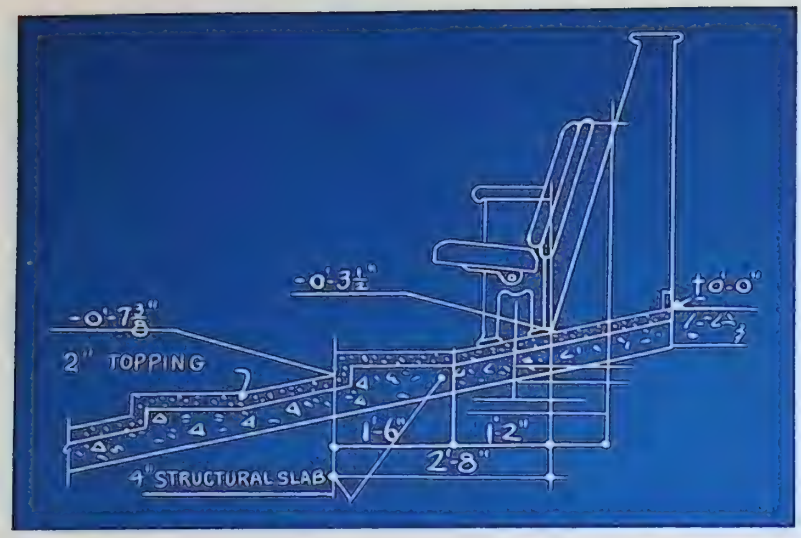


FIGURE 18—Sometimes it will be necessary to compensate for the higher rate of rise at the last few rows, to install level platforms in front of the seats for the patrons' comfort, thus providing a rest for their feet. These platforms should be installed when the difference in elevation between any two rows exceeds 3 inches. The drawing shows how such steppings and seat positions are generally arranged.

ing companies, for all graduations of the ordinary floor slopes required, both for direct and reverse slopes. The variation is made in the rear leg of the standard in order to retain the correct height of the seat edge under all conditions. (The construction of theatre chairs describing different types, coverings, and so forth, will be discussed later.)

Sometimes it will be necessary to compensate for the higher rate of rise at the last few rows, to install level platforms in front of the seats for the patrons' comfort thus providing a rest for their feet. These platforms should be installed when the difference in elevation between any two consecutive rows exceeds 3 inches. (See Figure 18.) When these platforms are installed, it will be necessary to provide a ramp from the level platform to meet the slope of the aisle. (See Figure 19.)

Aisles

The usual number of seats permitted between aisles is fourteen, and seven between a wall and aisle. This number varies, however, with the different local and state codes, which in some instances permit only ten seats between aisles. Some codes specify the maximum number of seats necessary to pass to reach an aisle, and in one instance where this number is specified as six, the interpretation was that only thirteen seats were permissible in the center bank and six in the side banks.

The regulations are so varied in regard to seating installations in different localities that the inexperienced designer should consult with a representative of the seat manufacturer who will furnish this equipment, as he will be very helpful and fully cognizant of all the related problems.

The next step in the seating layout is the determination of the required aisle widths and their locations. The location of the aisles is governed by the regulations referred to in the preceding paragraph, but in some cases it might prove advantageous to use fewer seats in the center bank and more in the side banks, using side aisles along the exterior walls. The proper layout is governed by the total clear width of the theatre, the size of the chairs to be generally used, and the required width of the aisles.

Most codes determine the width of the aisles by stating a minimum clearance at the front row with a certain increase in width for each foot of length of the aisle such as ½ inch to 5 feet.

The aisle width will be measured at right angles to the aisle and between the seat arms. Since each seat row is set to a different radius, it will be found that the angle of the seat arm with the aisle line will vary. This angle will be greatest at the first row diminishing towards the back, and on one side of the aisle the clearance line will be determined by the location of the front point of the seat arms, while the line on the opposite side of the aisle will be determined by the location of the rear point of the seat arms. (See Figure 18.)

Cross Aisles

It is sometimes desirable, especially when a cross aisle is involved, to have no variation in the aisle width. It will generally be permitted to make the aisle a clear width for its entire length which will be an average of minimum and maximum requirements.

Cross aisles will be required by the code in some instances when the distance between the first and last rows of seating exceed a certain figure. It may be required, at times, to extend these aisles through all banks of seats but in other cases the cross aisle is not required through the center bank, but only through the two side banks.

If cross aisles are used they should lead directly to the emergency exits.

Depression for Carpets

The aisles should be depressed for the installation of carpet and padding. This depression should be ⅝ inches with carpet strips and tooled edges. (See Figure 13.) Depressions for carpet in the aisles and elsewhere in the theatre saves wear and tear on the edges of the carpet, provides for more secure fastening of the carpet, and is less of a hazard to patrons emerging from their seats to the aisles.

The width of the carpet depressions should be at least 5 inches less than the clear aisle width as determined in accordance with the preceding paragraph. Should this resulting width at the widest part of the aisle only be 2 or 3 inches more than a multiple of 27 inches (the width of three-quarter carpet, then the width of the depression should be reduced to save cutting and sewing in the carpet installation, and the yardage of carpet.

The 5-inch differential, however, will allow for certain errors in the layout and the actual construction and installation of the seats, and will prevent the necessity of drilling holes for the seat standards too close to the carpet depression with the resulting cracking and chipping of the floor or the projection of the seat standards over the carpet.

Acoustical Treatment

Although it is recommended that the required acoustical correction necessary in the auditorium be checked by an acoustical engineer whose experience covers reproduced and amplified sound problems, we will outline herewith the general method of determining the amount and location of such material.

First, the optimal reverberation time of the auditorium, which is independent on the total volume, will have to be determined. Direct reacting tables giving the different values of the reverberation time for definite volumes are available, but the formula used is

$$t = .05V/As,$$

where t is the reverberation time, V is the volume, and As is the number of absorption units required, but it is first necessary to figure the number of absorption units provided in the auditorium by the contents, such as seats, carpets, draperies, and occupants. These amounts will have to be more or less assumed but the following method has been found very satisfactory.

Find the natural absorption on account of room volume from Table 1, or from the formula,

$$A = .29V^{2/3}$$

Next, assume one-third of the seats occupied with a coefficient of 4.7 each, two-thirds of the seats unoccupied with a coefficient of 2.3 each, carpet with a cofficient of 0.40 to the square foot, drapes with a coefficient of 0.60 to the square foot. The sum of these units, less the required number of units as derived from the formula $t = .05V/As$ will give the number of units which will need to be supplied by acoustical treatment, using a material whose average cofficient .60 to the square foot in the range between 128 and 4,096 cycles.

It is not necessary to take into consideration the noise coefficient as generally given for tested materials.

As previously pointed out, although

the above procedure will give the correct amount of acoustical correction, it will be necessary to acoustically treat any surfaces on which the sound waves may impinge, such as the rear walls of the orchestra and balcony, the face of the projection booth, the balcony or stadium facia, and in some cases the soffit of the mezzanine or balcony.

If the horns are properly flared it should not be necessary to use any acoustical treatment on the auditorium ceiling as the horns can be set so that the sound will not reflect from the ceiling.

When a glass screen is employed at the standee rail, velour drapes on the orchestra side should be provided to prevent the reflection of sound. These should be hung on tracks so they can be opened for standees if required.

Too much sound absorption is almost as objectionable as too little, since a "dead" house results and the amplification will have to be increased with consequent distortion. It is very important that this problem be solved early in the period when the interior is being designed as the required sound absorption treatment will very definitely affect the architectural result.

Decoration

Employing any one of the materials mentioned for acoustical treatment, the general decorative design can be developed with the use of run plaster or wood mouldings between panels, using curves or straight lines, and so forth.

In the case of fabric materials, their own design may be used with a variation of shades in the different panels or may be used as an all-over pattern like wall paper. With the front portion of the auditorium and the proscenium arch area free of any restrictions so far as materials are concerned, the designer is not limited as much as it might first appear. However, it must be remembered that this room will be seen, for the most part, only under subdued lighting.

Specal features included in the decorative scheme such as murals, panels, and so forth, which require lighting to bring out their full value, are for the most part a waste of money and at the same time may distract the audience's attention from the real reason for their being present and for the room itself, namely, to view and enjoy the program being shown on the screen or stage, in a pleasing, restful atmosphere and bodily comfort.

Wall Treatment

The finished wall coverings and therefore the decorative schemes for the theatre auditorium walls are limted to materials or a combination of materials which have definite sound absorbing characteristics. This is true of the entire area of all rear walls and that portion of the side walls which are in the direct path of the sound waves produced by the horn assembly at the rear of the screen. These horns are flared to throw the sound from the center of the screen through an arc varying from 87½ degrees to 105 degrees, depending on the width of the auditorium. This leaves certain areas of the side walls at either side of the proscenium arch and for a certain distance in front of the curtain line, on which the sound waves do not impinge. These areas, which are always within normal sight range of the seated persons, lend themselves to a different treatment using a material such as ornamental plaster, which is not necessarily sound absorbent. The outline of these areas should, however, be free of concave surfaces which might tend to concentrate stray sound waves and cause a flutter or dead spot in the seating area.

If plaster is used in this location, it should be well broken up with ornament or fluting which will trap the sound waves. Concave surfaces in any location should be avoided in the design of the auditorium, such as coved surfaces joining the walls and ceiling, or domes in the ceiling, unless they are covered with a sound absorbent material.

The entire side and rear wall areas except those portions as described above, and a wainscot about 5 feet high, require some acoustical treatment in order to eliminate side wall flutter caused by the sound waves bouncing away from these areas, even though the amount of acoustical treatment required to produce the correct optimal reverberation time may be less.

The materials which are suitable for acoustical correction all have the same fundamental characteristics, namely, a porous composition with varying amount of air spaces between the fibres. Materials which have an average of 60 per cent coefficient of absorption within the range of 128 to 4,096 cycles have been found to be the most satisfactory. These ratings are made by actual tests by the National Bureau of Standards and can be obtained for the asking.

There are many different types of materials available for this purpose, such as acoustical plasters, acoustical tiles, pierced metal or other fire-proof materials with the acoustical material behind, rockwool, cotton or similar loose material made up in blankets of different thicknesses which are attached to wall grounds and covered with a fabric.

Every material has its advantages and disadvantages, and limitations of design. Acoustical plasters are not adaptable to surfaces which are liable to wear or abrasion, and can only be

TABLE 1—Values of absorption from room volumes, based on the formula where absorption is equal to .29 times the cube root of the volume squared. (Interpolation for all values not given will give sufficiently accurate results.)

Volume	Absorption	Volume	Absorption	Volume	Absorption
1,000	29.	10,000	134.	100,000	624.
1,100	30.8	11,000	143.	110,000	665.
1,200	32.8	12,000	152.	120,000	705.
1,300	34.6	13,000	160.	130,000	743.
1,400	36.3	14,000	168.	140,000	782.
1,500	38.0	15,000	176.	150,000	817.
1,600	39.6	16,000	184.	160,000	854.
1,700	41.3	17,000	192.	170,000	890.
1,800	42.9	18,000	199.	180,000	925.
1,900	44.5	19,000	206.	190,000	959.
2,000	46.0	20,000	214.	200,000	990.
2,200	49.0	22,000	228.	220,000	1057.
2,400	52.0	24,000	241.	240,000	1120.
2,600	54.9	26,000	254.	260,000	1180.
2,800	57.4	28,000	267.	280,000	1240.
3,000	60.4	30,000	279.	300,000	1300.
3,200	62.6	32,000	291.	320,000	1350.
3,400	65.5	34,000	304.	340,000	1412.
3,600	68.0	36,000	316.	360,000	1478.
3,800	70.5	38,000	328.	380,000	1520.
4,000	73.0	40,000	339.	400,000	1570.
4,200	75.5	42,000	350.	420,000	1626.
4,400	77.5	44,000	360.	440,000	1676.
4,600	80.0	46,000	372.	460,000	1728.
4,800	82.5	48,000	383.	480,000	1780.
5,000	84.7	50,000	393.	500,000	1825.
5,500	90.2	55,000	420.	550,000	1945.
6,000	95.5	60,000	444.	600,000	2063.
6,500	101.	65,000	469.	650,000	2176.
7,000	106.	70,000	492.	700,000	2287.
7,500	111.	75,000	515.	750,000	2398.
8,000	116.	80,000	537.	800,000	2499.
8,500	121.	85,000	560.	850,000	2600.
9,000	125.	90,000	581.	900,000	2700.
9,500	130.	95,000	603.	950,000	2800.
10,000	134.	100,000	624.	1,000,000	2900.

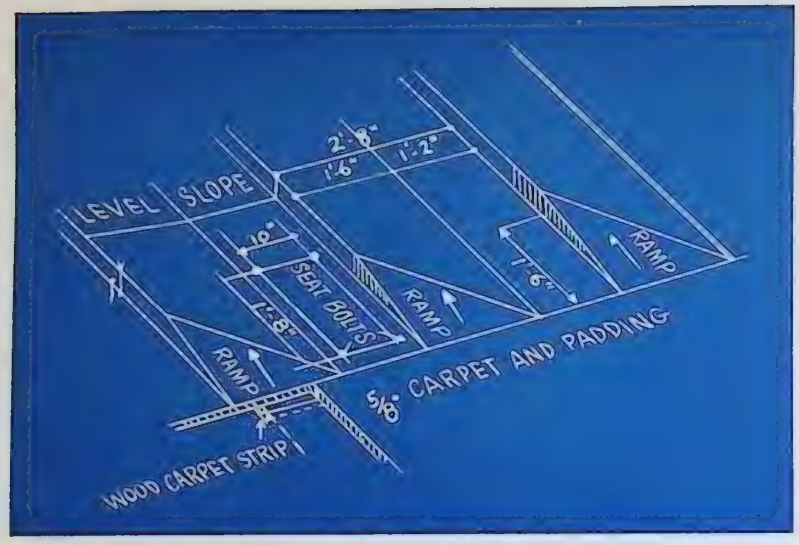


FIGURE 19—When platforms are installed (see Figure 18), it will be necessary to provide a ramp from the level platform to meet the slope of the aisle. Platforms for patrons' comfort are a must when the difference in elevation of any two adjacent rows of seats is greater than 3 inches. With 32-inch spacing, the space allowed for the chair is 14 inches, and the platform is 18 inches wide.

painted with a cold water paint or non-bridging lacquer, and even then care must be taken that the voids are not filled which will definitely ruin the acoustical qualities. This is also true of acoustical tiles, although some types can be painted with lead and oil without affecting their absorption too much.

One of the most versatile materials for this purpose is the rockwool blanket, 1 inch thickness, installed on the wall with 1 inch of air space behind it, and covered with a stretched fabric or decorative effect. This material is fireproof and can be applied to the bare masonry walls, requiring no plaster on these surfaces. Such an application, in addition to acoustical correction of the auditorium, also serves as a thermal insulation of the exterior walls and cuts down heat loss in the winter and heat infiltration in the cooling season, thereby effecting a savings in fuel consumption and in electrical current necessary to produce the cooling.

Rockwool blankets are made up in many sizes and a variety of coverings, but the type which has been found most acceptable for this kind of application is 1 inch in thickness compressed to a density weighing between 10 and 12 pounds to the cubic foot, covered on both sides and edges with flame-proofed muslin, and on one side with chicken wire, with sufficient wire ties through the blanket joining the wire and the muslin, to keep the rockwool fibres in place. These ties are very essential and should be insisted upon, as otherwise the fibres will become separated and fall to the bottom of the panel, thereby nullifying the required acoustical correction.

The standard rockwool bat as described above is 2 feet wide by 4 or 8 feet long and should be hung vertically and securely nailed to wood grounds installed on the masonry walls around the permimeter of the panels, and horizontal grounds 24 inches on center in the panels. These grounds should be 1 inch in thickness to provide the required air space behind the rockwool and 2 inches wide for the horizontal grounds. (See Figure 20.) The horizontal grounds at the 4 foot points should be at least 3 inches wide in order to properly secure the bottom edge of the first bat and the top edge of the next one. The grounds around the perimeter of the panel whether it be rectangular or irregular in shape should be 3 inches in width with a secondary ground on the outer edge 1 inch wide and 1⅛ inches thick. (See Figure 21.) The last mentioned ground is used as a tacking strip for the decorative fabric and the 1⅛ inch thickness is required so the fabric can be smoothly stretched without touching the rockwool bat.

Fabrics

In normal times, many fabrics suitable for wall coverings are available in almost any combination of colors, and designed at the proper scale for this purpose. They can be had in silk and cotton damasks, cotton and rayon damasks, velvets, homespuns, monks cloth and glass cloth. The materials which are woven especially for this use are 50 to 52 inches in width, with matching patterns. This is a requisite as it will be necessary to sew several widths of material together to cover the area of most panels making up this type of decorative scheme. (Attention is called here to the fact that some fabric materials are manufactured for use as window draperies, and the like, and do not match, and are not adaptable for this special use.)

It is generally required that these fabrics be flame-proofed, and it is good practice to have them so treated on account of safety, whether or not it is required. The flame-proofing solution may be applied to the fabric before sewing, which is the preferable method on account of shrinkage during the process in certain types of fabrics, or by spraying after the material is stretched in place. If the latter method is used, allowance must be made for this shrinkage when the fabric is tacked to the grounds.

Fabrics woven entirely of glass thread or a combination of glass and asbestos are just becoming available and seem to have great possibilities for theatrical use. This type of fabric, due to the materials from which it is woven, is fire-proof and easily cleaned. Up to the present time, however, this type of fabric with woven designs of any desired combination of colors is not on the market, and designs must be printed on the fabric with dyes or paints which are not too stable, and one of its great advantages of cleaning with a damp cloth is more or less discounted by the fading of the colors.

The proper installation of the fabric panels on the wall panels should be done by mechanics who are familiar with this special type of work. There are many decorating firms who specialize in this type of work including stage draperies, and it will be found a distinct advantage to use their services if available.

The large fabric panels must be stretched to just the right tension depending on the qualities of the material, as there will always be a certain amount of variation in this tension due to changes in the humidity. This will result in wrinkles one day, and perhaps pulling away from the tacking strip another time. Therefore, it is necessary that the grounds be securely attached to the masonry walls using either cut nails driven in the masonry joints or cinder block, or toggle bolts if the inner face of the masonry walls are of hollow tile. The fabric panel should then be temporarily tacked in place at the top and the pattern plumbed, using a plumb bob. The entire perimeter of the panel is then tacked to the grounds with 3-ounce tacks, 1½ to 2 inches apart. If fabric is in large panels where several widths of material are sewn together, additional tacking is required on either side of the seams. The tacks should be then covered with a fabric guimpe strip, tacked and glued, or by a narrow wood mould.

THE STADIUM

If the auditorium is to be the stadium type, the entrance to both the stadium and orchestra will, in most cases, be through a vomitory or vomitories from the lobby or foyer. These vomitories will empty into a cross aisle separating the orchestra seats from the stadium seats, with stepping adjacent to vomitories, leading to the stadium seating. These steppings will connect with the stadium aisles.

Due to the fact that this cross aisle will carry all of the incoming and outgoing traffic, it should be at least 5 feet wide, and increased in proportion to the number of seats in the house. There should be a solid rail, similar to a regular standee rail, immediately behind the last row of orchestra seats, and a solid rail forming the facia of the stadium.

The location of this cross aisle will be governed greatly by the general plan but should be so located as to permit the greatest number of seats possible in the orchestra section where they will produce the greatest revenue.

In some instances it will be expedient to install a cross aisle in the stadium

separating the first six to ten rows from the rear rows. This portion can then be designated as a loge and command the higher prices.

The level of the floor for the first row of seats must be raised sufficiently above the cross aisle to bring the eye line of the occupants above the heads of those using the cross aisle. This measurement should be at least 2 feet and 6 inches, a few inches more would be preferable. Seat steppings should be at least 33 inches in width and more if possible. The stadium facia rail should be of solid masonry construction and either finished with cement plaster or linoleum, and should project above the level of the first row floor, 2 feet and 4 inches.

The solid portion of this rail can, if desired, be reduced to about 1 foot and 8 inches above the level of the seat bank, with an open ornamental metal or wood railing on the top. An open railing for the full height is not desirable, however, on account of the eye line of the persons passing in the cross aisle. Sometimes and ordinary pipe railing is used in this location and covered with removable fabric drapes or skirtings. This method permits the patrons in the first row to extend their feet through the rail into the aisle and interfere with those passing.

It will be quite impossible to prevent the front row occupants from resting their feet on this railing and exerting considerable pressure, and this fact must be taken into consideration in the design so the rail will take the abuse to which it will be subjected. To provide sufficient toe and leg room, the first stepping should be at least 4 inches wider than the balance of the steppings.

All suggestions in the preceding paragraphs apply to similarly located railings in a balcony or mezzanine, with exception of the construction of the front railing. On account of the weight of solid masonry this should be constructed as shown in (Figure 22).

The sight line for the stadium seating should be figured over the head of the first row in front rather than the second row as recommended for the orchestra seating. This will, in most cases, result in a total rise for each stepping greater than 7¾ inches, which is the limit under most codes, and will necessitate the introduction of intermediate steps in the aisles. These steps should fill the entire width between the seat standards on either side of the aisle to prevent accidents.

The steppings in the aisle should be depressed ⅝ of an inch for carpet and carpet strips installed at the angle of each tread and riser. A wood carpet strip the full height and bolted to the face of the riser as shown in Figure 23, is more expensive but provides the best fastening and will result in less wear on the carpet.

Figure 24 shows another method for installing carpet on steppings, using a patented rubber nosing strip. This rubber strip can be had in most colors to match the predominant colors, which is sometimes desirable in a well lighted stair, but in the case of aisles in balconies, stadiums or mezzanines, the strip should be white in color to define the edge of the steppings.

These rubber nosings are rather expensive so far as the first cost is concerned, but since their location is at the point of greatest wear, the ultimate savings in carpet replacement, and insurance rates on account of fewer accidents will more than compensate for the cost of their installation.

Aisle lights should be provided on every other row on each side of the aisle, and be staggered to provide lighting on each stepping. Side aisle seat standards should be provided with aisle lights at each row. Provision should also be made for step lights in other locations, especially at the intersection of the aisle and the cross aisle, to illuminate the steppings for their entire length.

The stadium plan will often provide sufficient space underneath the stadium for most of the necessary toilets and service rooms. Ample headroom to permit most of this space to be used can be realized by the use of a few steps down from the foyer level.

In many cases, it will be necessary to install doors in the vomitories to eliminate the possibility of noise and light entering the auditorium from the lobby or foyer.

THE MEZZANINE

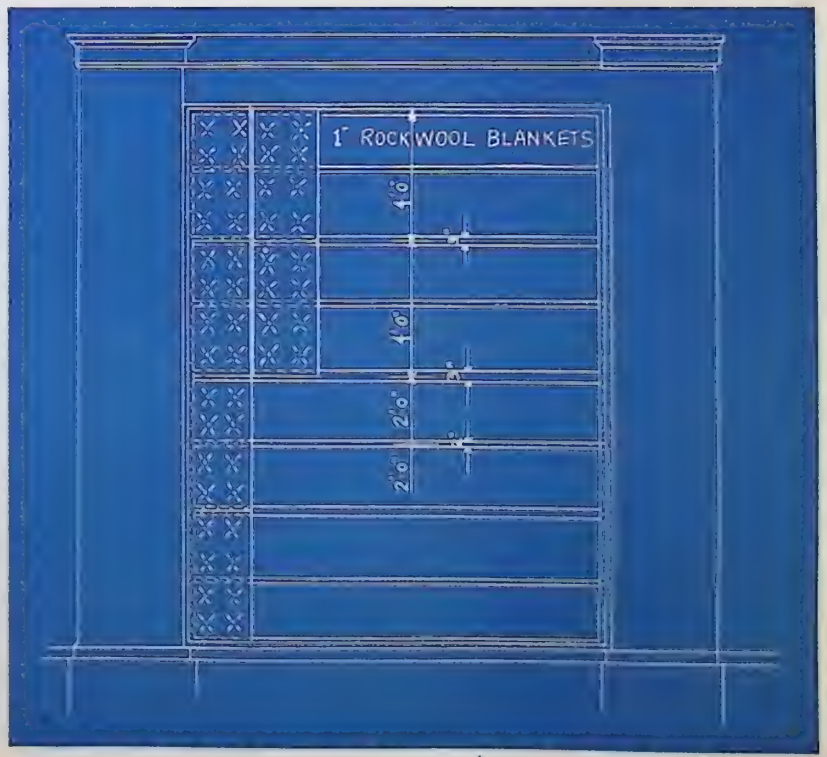
When it is desirable to provide from two to three hundred seats in addition to those that can be provided in the orchestra, the mezzanine with from ten to twelve rows will many times be the best solution of the problem. Since a certain portion of the mezzanine will overhang the orchestra seating area, it will be necessary to provide cantilever supports for the front part of the mezzanine, to preclude the necessity of columns in the orchestra seating area which would ruin the view from many orchestra seats. This type of construction is not especially costly as columns supporting the fulcrum beams can be located at the line of the standee rail where they will cause no such interference.

The height of the mezzanine in relation to the other floor levels will be determined by the necessary location of the forward edge or toe of the finished mezzanine soffit which should clear the line of sight from a person standing at the standee rail to a point approximately 20 feet above the stage or platform at the screen location. With this point located and the thickness of the finished ceiling and construction determined, the level of the first or front seat bank of the mezzanine can be obtained.

The rise of the second seating bank above the first should be determined by figuring the sight line from this level over the head height of the first row head to the elevation of the bottom of the picture. However, in order not to have a steep pitch, this rise should be no more than 9 inches so that no intermediate steps will be necessary in the aisles. The actual rise of the step in the aisle can be reduced to 7¾ inches by sloping the seat platforms from the rear to the front, and seat standards installed to accommodate the slope. By using the same rise between all rows, the sight line will progressively improve for the seats behind the second row.

The notes on aisles, aisle lighting, rails and steppings included in the para-

FIGURE 20—The standard rockwool bat is 2 feet wide by 4 or 8 feet long, and should be hung vertically and securely nailed to wood grounds installed on the masonry walls around the perimeter of the panels, and horizontal grounds 24 inches on center in the panels. These grounds should be 1 inch thick (in order to provide the required air space behind the rockwool) and 2 inches wide.



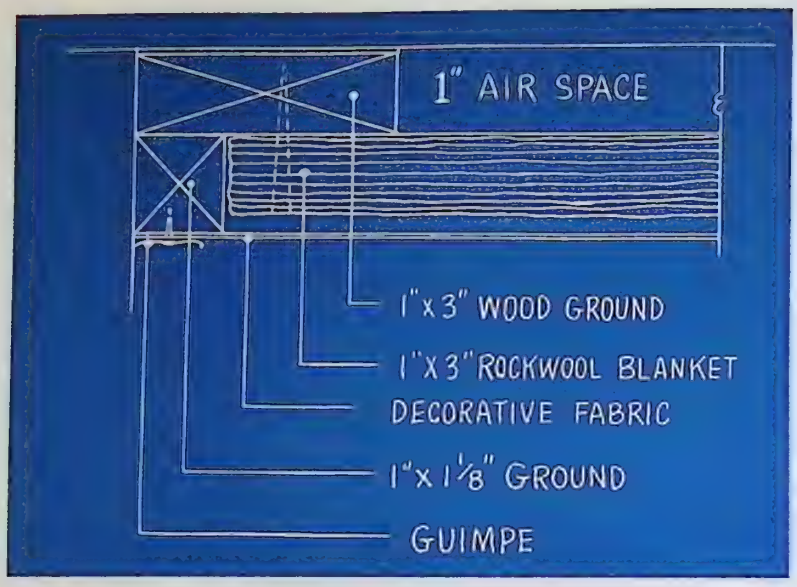


FIGURE 21—The grounds around the perimeter of the panel, whether it be rectangular or irregular in shape, should be 3 inches in width, with a secondary ground on the outer edge 1 inch wide and 1¼ inches thick. This last is used as a tacking strip for the decorative fabric and the 1¼-inch thickness is required so the fabric can be smoothly stretched without allowing it to touch the rockwool bat below.

graph on Stadiums are all applicable to the mezzanine construction.

The access to the mezzanine will be by means of two stairways, one on either side, from the foyer level to a cross aisle at the uppermost level of the mezzanine, or to the level of the first row and front cross aisle at the side seat banks. The design may develop where a mezzanine foyer is desired and with this scheme, the stairs would end at the mezzanine foyer level and the mezzanine seating will be reached through a vomitory or vomitories from this foyer. The last-mentioned scheme rarely occurs when only a mezzanine is included but is primarily used when a full balcony is indicated.

The width of the last stepping in a stadium, mezzanine or balcony, also that of the stepping in front of a cross aisle with a solid railing, must be increased over the normal width 9½ inches to provide clearance for the top of the sloping backs of the chairs. In a very large balcony where the last row of seats is a great height above the stage, this figure can be reduced to 6¾ inches as in such instances the seat backs will be tilted forward at their tops to provide the necessary comfort.

PROSCENIUM

The proscenium is the area at the stage end of the theatre embraced in the normal range of vision by seated patrons looking directly at the stage or picture. This includes the wall dividing the stage and the auditorium, the proscenium arch and the wall areas for a certain distance at either side of the proscenium arch. This is the space in the auditorium which does not require acoustical treatment, and, therefore, can be made a design feature with ornamental plaster, painted decoration and special lighting effects, in conjunction with a colorful and well designed stage setting.

The proscenium opening or arch should, of course, be of proper proportion and the permanent construction for this feature should allow for draping with borders and legs inside of the opening which will still permit the proper sight lines from the side seats, also to clear the light beam from the projection machines.

There will be some cases, of course, where no provision will be made for a stage or platform and no proscenium wall or opening, but with the screen on the back wall of the theatre. In such cases it is preferable to provide for installation of the horns directly behind the screen rather than to one side or below it.

THE STAGE

Although a motion-picture theatre is designed and built primarily for the showing of pictures only, sooner or later it will be found desirable to have some sort of a platform for speeches, Bingo, or other promotional activities which are an inherent adjunct to the operation of a theatre.

Since there should always be a space of 18 to 20 feet between the picture screen and the first row of seats, this space with the exception of a 5-foot aisle in front of the first row can be used for a platform 3 to 4 feet above the orchestra floor, and this platform with a proscenium-arch treatment provides for the necessary space and facilities for hanging a screen curtain, and closing in to the picture with draperies, and so forth which can add greatly to, and be the general focal point for the decor of the auditorium. The screen curtain should be hung on a track, and opened and closed by an automatic electric curtain machine controlled by push buttons on stage and in the projection booth.

Footlights, border lights, or floods in the auditorium ceiling, also operated from the projection booth, should be provided for lighting the platform or stage when being used as such and for lighting the screen curtain and stage set at the opening and closing periods.

In connection with the above recommendations, it should be noted that such an operation is not possible in some localities on account of agreements with the local stage hands' union. Such agreements and union rules should be checked for the particular locality.

Easy access to the stage platform should be provided at each side of the proscenium.

Plastering or finishing of the walls and ceiling of the stage is not necessary or desirable since it is closed from the view of the audience by the stage set, but provision should be made in the ceiling construction for the hanging of the tracks, borders, and the like.

The floor of the stage should be hard wood 2¼-inch face and stained a dark color to offset reflections of the light beam, or concrete covered with linoleum.

The stage equipment necessary to operate a motion-picture theatre with provisions for an occasional civic program, vaudeville act, and so forth, does not require the construction of a gridiron and counter-weight equipment to hang and fly scenery, but certain provisions should be made to hang the necessary legs, borders and curtain, either permanently or in such a manner that they can easily be lowered for cleaning or replacement. For this reason a suspended or otherwise plastered ceiling is neither necessary nor desirable.

If fire-proofing is required on the steel beams which support the stage roof, or if these should be of reinforced concrete, then, clip angles projecting below the fire-proofing, or in the case of reinforced concrete, steel eyes should be provided for in the construction details. These should be attached in alignment across stage and up and down stage at the location of the different stage drapes.

The usual complement of stage draperies for a theatre of the size and type in question will consist of a screen curtain about 1 foot in front of the motion-picture screen, a main valance directly behind the proscenium arch and two intermediate sets of masking borders and legs, so placed and of sufficient width and depth to mask the off stage space from the front row of seats.

In many cases, an additional main proscenium curtain may be installed directly behind the valance.

Since the stage height will not permit flying these curtains, they will be made in pairs with a 4-foot center overlap and hung on tracks so rigged to permit the curtains to be opened from the center towards each side of the stage. The curtains may be operated by hand, but in this kind of operation they should each be equipped with automatic curtain machines controlled by push buttons located on the stage, also on the front wall of the projection room at each machine location.

In order properly to hang, tie off, and mask the stage set, the distance from the underside of the proscenium arch to the underside of the stage roof beams should be at least 4 feet.

The curtain tracks will be attached to a pipe or wooden batten by means of leveling chains, and the batten will be

supported at the ends and quarter points by means of cables or ropes passing through sheaves attached to the roof structure. The cables will lead from the sheaves through a head block at one side of the stage and at this point the cables will be secured to a bridle arrangement which in turn will be attached to the raising or lowering cable. This will be operated by a hand winch located at the proper height above the stage floor. Bolts through the masonry wall of the stage should be provided during construction to secure the brackets for the winches and head blocks.

PROJECTION BOOTH

The projection booth is the most important space in a motion-picture theatre and the designer should be familiar with its operation, and the necessary equipment which must be installed. He should also be familiar with the regulations and codes which apply to its construction and layout, and check with the safety requirements for the protection of the operators and the public. Standard requirements which cover this section of the theatre have been adopted by the American Society of Motion Picture Engineers and these standards, if followed, will comply with most codes. However, some state and local codes have special regulations which should be investigated before starting construction.

Level of Floor

If the auditorium ceiling or other conditions of design do not allow for the location of the projection room floor to permit headroom above the top level of the mezzanine or balcony, then the floor of the projection room must be raised sufficiently to prevent interference with the light beams from the projection ports by patrons passing in front.

The height from the floor of the projection room to the center of the projection port will vary with the equipment which is to be used and the steepness of the projection angle. The height, if the beam is level, will be 48 inches and will decrease to approximately 30 inches as the height of the projection room floor increases above the screen.

The floor of the projection room should be raised above that of the top level of the mezzanine, stadium, or balcony, to provide for a 7-foot clearance under the light beam.

Projection Room Slab

On account of the many different runs of conduit required for the necessary a. c. and d. c. wiring to the projection room equipment, particularly in instances where three projection machines are installed and perhaps a spot or effect machine, it is almost impossible to install this conduit, which in some cases must be 2 inches without having to cross the runs. It can readily be seen that it is almost impossible to conceal these runs in an ordinary 4- or 6-inch floor slab. It is a very good policy to drop this floor slab 6 inches and provide for anthracite cinder or lightweight concrete fill to bring the floor to the correct level. It is, of course, possible to conceal this conduit in a suspended ceiling under the floor slab, but the first method will be found the most satisfactory and convenient. Very often it will be found that the type and amount of equipment will not have been decided upon at the time the structural slab is scheduled to be installed, therefore if provision is made for the conduit to be installed after the slab is poured, there will be no delay in the construction schedule.

TABLE 2—Distance from floor to center line of projection ports and to center line of observation posts at various projection angles.

Projection Angle (Degrees)	Distance from Floor to Center Line of Projection Ports	Distance from Floor to Center Line of Observation Ports (Feet)
—6	51	64
—4	50	63
—2	49	62
0	48	61
2	47	60
4	46	59
6	45	58
8	44	57
10	43	56
12	42	55
14	41	54
16	40	52
18	38½	51
20	37½	50
22	36½	50
24	35½	50
26	34	49

Ceiling

A 10-foot ceiling in the projection booth is desirable and in many cases mandatory. Minimum depth from front to rear wall 10 feet—12 is much better. A length of about 14 feet is required for two projection machines, but if space is available, 20 feet is more advantageous.

Port holes in the booth must be protected by automatic and hand-operated fire-proof shutters which are tripped by fusible links and also by manual release at each exit from the booth. Optical glass in the projection ports and plate glass in the observation ports will exclude both noises from the theatre. Acoustical treatment of the ceiling and the walls above the wainscot for absorbing noises in the booth is desirable when the booth is located near the seating area.

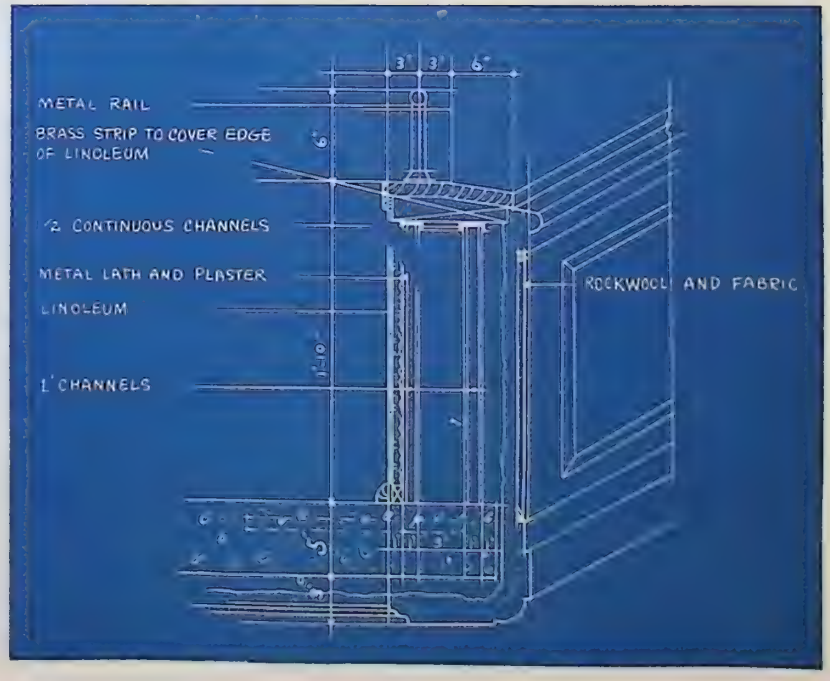
Projection Ports

Each projection machine will require two openings or ports through the front wall of the booth, one for the light beam and one for the projectionist. The size of these ports are sometimes regulated by code or fire regulations, but the average and ample size is 10 inches by 10 inches for the projection port and 10 inches by 12 inches for the observation port.

The location of the center of these ports above the floor of the projection room will be governed by the angle of projection which in turn varies with the difference in elevation of the projection room floor and the center of the picture. Table 2 gives the average height of these openings for the different projection angles. These will vary somewhat with different type of equipment.

The size of the ports referred to above is that on the booth side of the wall. The ports should be flared or beveled towards the auditorium, on the bottom and both sides of the port opening.

FIGURE 22—The stadium (or balcony) rail should be of solid masonry construction and finished with cement plaster or linoleum, and should project above the level of the first row floor 2 feet 4 inches. The solid portion of the rail can be reduced, with an open ornamental metal or wood railing on top. An open railing for the full height is not desirable. Plain piping is sometimes used for the railing.



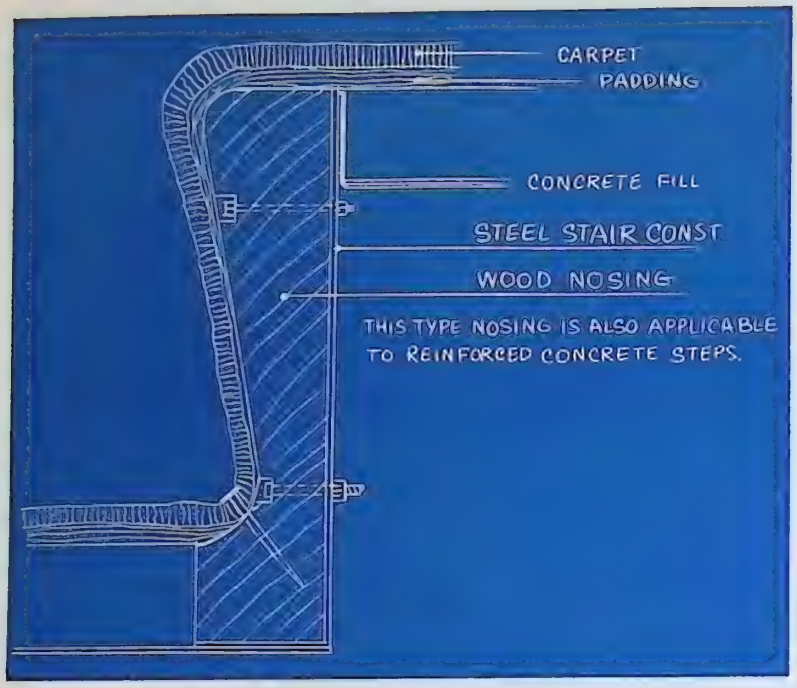


FIGURE 23—The steppings in the aisle should be depressed ⅝ inch for carpet, and carpet strips installed at the angle of each tread and riser. A wood carpet strip the full height and bolted to the face of the riser is more expensive but provides the best fastening and will result in less wear on the carpet. Steps should fill the entire width between seat standards on either side of the aisle.

Both the observation and the projection ports should be closed with glass in adjustable frames. A good grade of optical glass should be used for the projection port and this glass should be in a frame which can be adjusted to be normal to the projection angle, and be easily removed for daily cleaning. Figure 25 gives one solution of this problem. The observation ports should be closed with a good grade of plate glass, set in a frame which will permit the glass to be cleaned easily on both sides. If the glass is tilted slightly from the perpendicular, it will overcome reflections and improve the view of operator. (See Figure 26.)

If spotlights are contemplated, the ports for this equipment will be much larger as the spots must pivot horizontally and vertically to cover the entire stage. No separate observation port is necessary in this case. The spotlight opening should be closed by means of polished wire glass set in removable stops. Since this opening is necessarily large, the glass should be set in a frame with metal stops, without provision for hinging, and it will be necessary to clean the one side by use of a ladder, and so forth.

When effect machines or stereopticons are installed, these require specially shaped openings, the sizes of which should be obtained from the manufacturer of the equipment.

All projection and observation openings must be protected on the projection room side with safety shutters of steel or transite board which will close automatically in case of a fire in one of the machines or elsewhere in the booth.

These shutters are held in the open position by means of an arrangement of cords and fusible links. A metal shaft above the openings and the length of the front wall of the booth is installed in ball-bearing hangers. The shaft has pegs inserted over the center of each opening from which the safety shutter is hung by means of a cord or wire with a fusible link. Each cord is looped over the proper peg in the shaft. On one end of the shaft is a counterweighted arm normally held in position, so the loops are secure on the pegs, by means of an arrangement of cords and pulleys with the cord running over the center of the machines and broken with fusible links at each machine. When the cord is severed, the counterweight will drop and the loops will slip off the pegs allowing all safety shutters to fall into a closed position. Provision for manually dropping the shutters should also be made at each exit from the booth. The safety shutters on spot light and other large openings should be counterweighted.

Other Details

Mechanical and gravity ventilation is required in the booth proper, with one system directly connected to the lamphouses.

Wiring diagrams for sound and projection should be obtained from the manufacturer of the equipment. Convenient outlets should be installed in the front wall of the booth, at each machine location for connecting trouble lights and soldering iron, unless these are provided on the equipment.

Although not always compulsory by the governing codes, two exits at opposite ends of the booth should be provided for the safety of the operators.

Special Rooms

A separate rewind and film storage room should be provided, also generator and rheostat room. Placing of the generator should allow sufficient clearance from walls to allow the removal of the motor and the generator from the base. Provide large gravity ventilation directly over generators and over the rheostat bank to dispel the heat.

If a separate rewind room is installed, this should be equipped with an observation port to enable the operator to check the picture when he is away from the machine.

An adjacent toilet for the operators is desirable and in some localities either a code or a union requirement.

THE RETIRING ROOMS

The entrance to the ladies' and men's retiring rooms and toilets should be separated and screened from each other. Sometimes the plan will develop so that these areas are located on opposite sides of the theatre, or one on the orchestra floor and one in the basement, or the mezzanine, directly above or below the other.

If the exigencies of the plot and plan suggest that both should be on the level below the orchestra floor, a common lounge between is good planning, provided, of course, the budget will cover the additional cost. Such a lounge can be tastefully decorated and can have facilities for dispensing candy, popcorn and soft drinks, and perhaps a juke box for the entertainment of patrons who wish to wait for friends or for the start of the feature picture.

Ladies' Suite

In any case the ladies' suite should have, in addition to the toilet room itself, an ante-room sometimes called a powder or cosmetic room, equipped with make-up mirrors and shelves, chairs and a sofa, and incidental pieces such as side tables and standing lamps to enhance the decorations.

Ash trays should be plentifully supplied with a sand urn immediately adjacent to the entrance to receive unfinished cigarettes when the ladies leave. The small or table type ash trays should be bolted securely to the tables or stands to preclude the necessity of frequent replacement.

The walls of this room should be covered with some material which does not soil easily and from which the lipstick can easily be removed. The new glass or plastic fabrics which will soon be obtainable in a variety of patterns and colors lend themselves to this purpose.

This room should be well lighted but of the type that will be complimentary to the ladies' make-up. This result can be accomplished with tinted bulbs and the proper colored lamp shades.

If a special emergency room is not provided in the theatre, there will be occasions when this room will have to serve this purpose for lady patrons who become ill, therefore one sofa should be large enough so the patient can recline at full length. This suggestion may appear to be a trifle farfetched to the uninitiated but the instances when such accommodations have been used for

emergency maternity wards are by no means uncommon, and the writer's experience covers the birth of a healthy pair of twins under such circumstances during the opening week.

Men's Suite

The men's ante-room or smoking room need not be as large as the ladies'. In fact it is often wiser that this room serve only as a vestibule and screen for the toilet room with no provision for lounging or congregating. This is especially true if it cannot be well supervised, since it might become an incentive to start a sociable crap game if made too spacious or too comfortable.

In the writer's opinion, the best finish for this room is a ceramic tile floor and glazed tile walls in pleasing colors, with the tile the full height from floor to the ceiling, which can also be covered with tile, at a small additional first cost but with a reduced cost of maintenance for the entire life of the building.

Telephones

Public telephone booths are sometimes planned in the ante-rooms but the proper location for these are in the main lounge or the foyer where they can be more easily supervised. The reason: a luxurious men's lounge and accompanying public telephone booths of a prominent Broadway movie palace was completely taken over shortly after opening by a contingent of sporting gentry who turned out to be booking horse race bets, and were using this public room as their private office.

Toilet Rooms

The toilet rooms proper should be as spacious as possible within the limits of the plan and the number of people which they will be required to serve.

The minimum number of fixtures in the ladies' toilet would be two water closets and one lavatory, and for the men's one water closet, two urinals and one lavatory. These accommodations should be increased in keeping with the seating capacity, and to comply with the sanitary and building codes of the locality. In case no such regulations are in effect, at least one water closet for males and one water closet for females should be provided for each 300 persons or fraction thereof, comprising the total capacity of the theatre including standees. Urinals may be substituted for water closets for males to the extent of 60 percent of the number required.

At this point, and supplementing the opening paragraph of this section regarding the location of the toilet rooms, the designer's attention is called to the fact that there will be a certain amount of saving in the cost of the necessary piping, sewer connections, and the like, if the toilet rooms can be kept in the same area and immediately adjacent to each other. (See Figure 27.)

Wall Finishes

Ordinary painted plaster walls which are so often resorted to on account of the initial cost are never satisfactory in this location since they cannot be kept clean and sanitary, and will be a constant source of irritation and maintenance cost throughout the occupancy. This fact also applies to the usual practice of installing a wainscot of an acceptable material with painted plaster walls above.

Long and costly experience has proven that the most satisfactory method, and in the long run the cheapest, is to cover the walls from floor to ceiling, with a hard wearing impervious material which can be cleaned easily and requires only soap and water to keep them sanitary and presentable. If only a wainscot is installed, even if the plaster wall above is too high to be reached from the floor, someone will insist on climbing up on the fixtures in order to leave his peculiar type of poetry or his name and telephone number.

Since it appears to be good economy to entirely cover the walls as above suggested, then for only a small additional cost the finish ceiling can be of the same material which produces a room which will never require painting, and necessitates only the very minimum of maintenance throughout its existence.

Glazed ceramic tile for the walls and ceilings, and encaustic tile for the floors, is at present the most satisfactory material available to use. It can be obtained in all colors and designs, is easily applied, not expensive, and serves the purpose better than any other so far developed. Marble and glass may also be used, but marbles are more or less porous and inclined to discolor under the special use, and glass sooner or later develops cracks which are both unslightly and unsanitary.

All intersections of floors, walls and ceilings should be coved, using special tile, to facilitate cleaning.

Stall Partitions

The dividing partitions between the water closets can be constructed of masonry faced with tile, but the most satisfactory and cheapest to install are the stock metal partitions which come complete with stall doors, hardware, toilet paper holders, etc. These can be obtained with a priming coat only, with a baked enamel finish, or in porcelain enamel. One of the last two finishes are preferable.

The new type of hanging partition which have no supports from the bottom of the partition to the floor enable the cleaners to mop with the minimum of interference. This type requires the installation in the ceiling construction of structural channels for their support, and their use is limited to construction details of the floor above and the available height and resulting head room.

That portion of the supporting posts or jambs, from the bottom of the partition to the floor, should be of unpainted stainless steel to absorb the wear and tear of mopping and other abuses. A channel of the same material, securely welded to the bottom of the partitions, has also been suggested by some theatre maintenance men and architects, to retard the inevitable rusting which will occur at these points.

Lighting

In addition to the general lighting of

FIGURE 24—Another method of installing carpet on steppings uses a patented rubber nosing strip. This rubber strip can be had in most colors to match the predominant colors which is sometimes desirable in a well-lighted stair, but in case of aisles in balconies, stadiums, or mezzanines, the strip should be white in color to define the edge of the steppings. A wood ground is used for tacking.



the toilet rooms and the lights at the mirrors over the lavatories, it will be found that an additional light directly over the water closet stalls will help remarkably well in keeping these spaces clean. It is psychological but it works. A recessed fluorescent fixture with two 40-watt tubes for each two or three stalls is recommended.

Toilet Fixtures

Water closets should be equipped with open front seats, without covers and silent action flush valves rather than the tank type. The water pressure should be checked to be certain that it will be sufficient to operate the flush valves.

Urinals should be of the stall type and should have finished sides so they may be installed with at least 4-inch clearance for cleaning. Lips of the urinals should be installed slightly below the floor level and the floor should slope to the urinals. This will circumvent water standing on the floor and the urinals may be used as floor drains. Automatic valves for periodic flushing of the urinals should be used rather than the hand or foot valves.

Lavatories should be about 18 inches in size with self-closing faucets to prevent waste of water and the possibility of being left turned on and resulting in a flood. Lavatories should be provided with a well and dispenser for liquid soap. In some instances the soap well is cast in the body of the lavatory, otherwise an opening should be provided for attaching a metal container and dispenser.

Mirrors in metal frames and recessed in the tile wall should be installed over the lavatories. It will be necessary to provide for the installation of towel cabinets for either the paper or fabric type.

Allow sufficient space for used towel receptacles adjacent to the lavatories.

Ventilation

The toilets should be mechanically ventilated by a separate exhaust fan system, with exhaust grille in the ceiling, and also in the wall over each water closet and urinal.

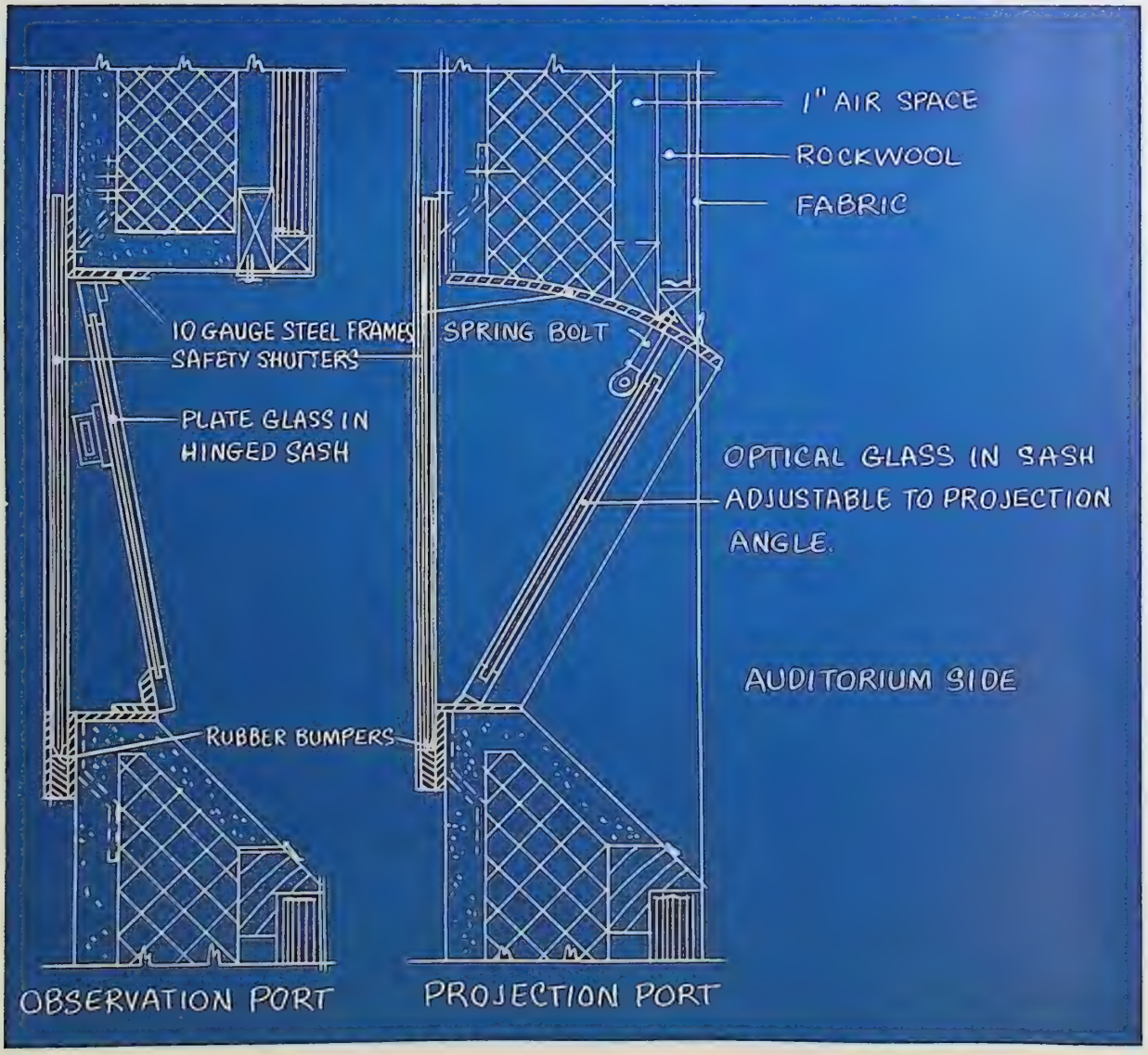
The door to the toilet should be provided with a louvre or be undercut.

Water-Proofing

If the toilet room is located above a finished space on the immediate lower level, a membrane water-proofing should be installed on the rough slab or flooring and turned up 6 inches on the toilet room walls.

FIGURE 25—A good grade of optical glass should be used for the projection port (right-hand drawing) and this glass should be used in a frame which can be adjusted to the projection angle, and be easily removed for daily cleaning. The drawing shows one solution of the port problem.

FIGURE 26—The observation ports (left-hand drawing) should be closed with a good grade of plate glass, set in a frame which will permit the glass to be easily cleaned on both sides. If the glass is tilted from the perpendicular, it will overcome reflections and improve the view.



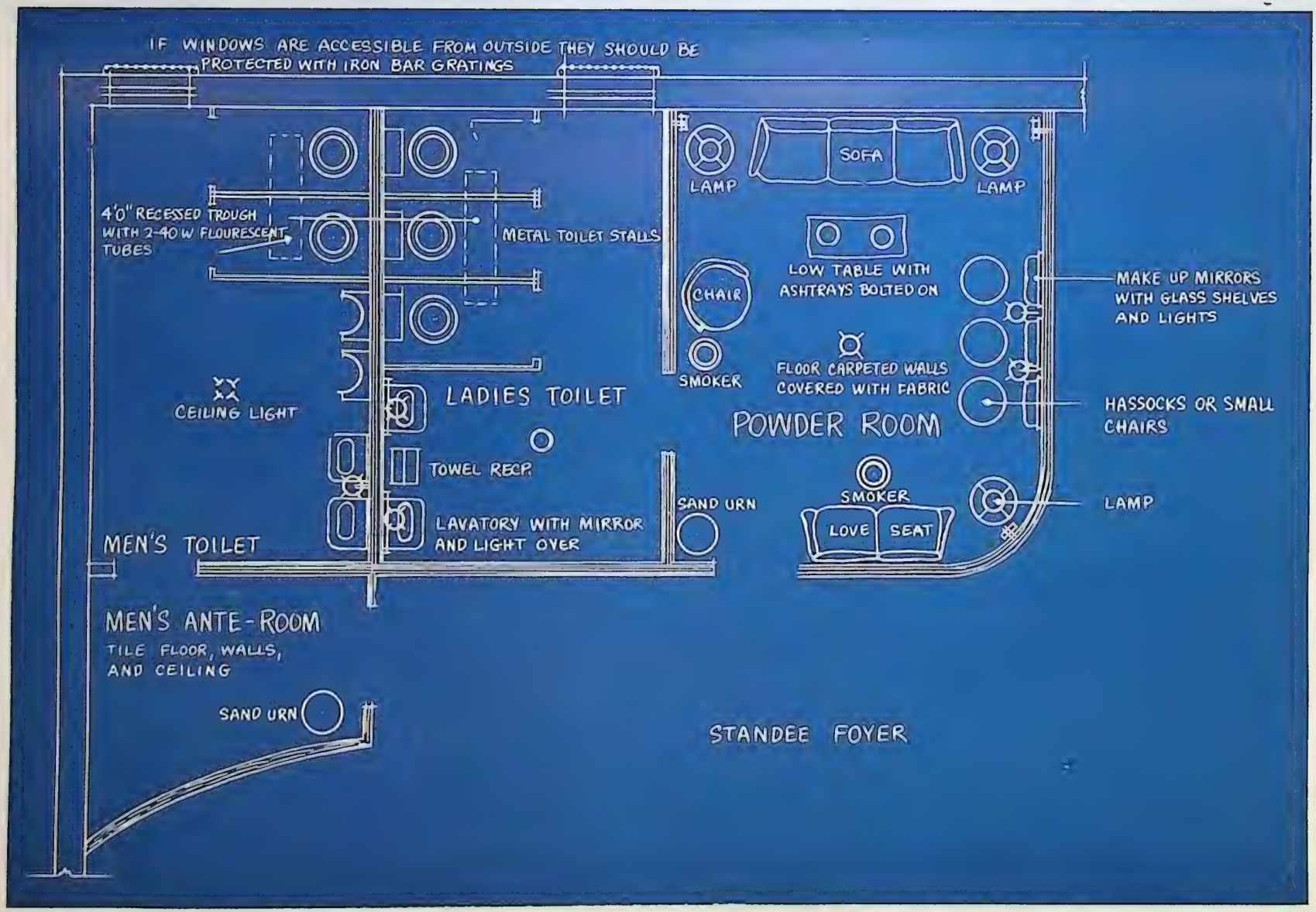


FIGURE 27—A certain amount of saving in the cost of the necessary piping, sewer connections, and the like can be effected if the toilet rooms can be kept in the same area and immediately adjacent to each other. Toilet rooms should be as spacious as possible within the limits of the plan and the number of people which they will be required to serve. The minimum number of fixtures in the ladies' toilet would be two water closets and one lavatory, and for the men's one water closet, two urinals, and one lavatory. These accommodations should be increased in keeping with the seating capacity, and to comply with the sanitary and building codes of the locality. In case no such regulations exist, at least one water closet for males and one for females should be provided for each 300 seats in the theatre.

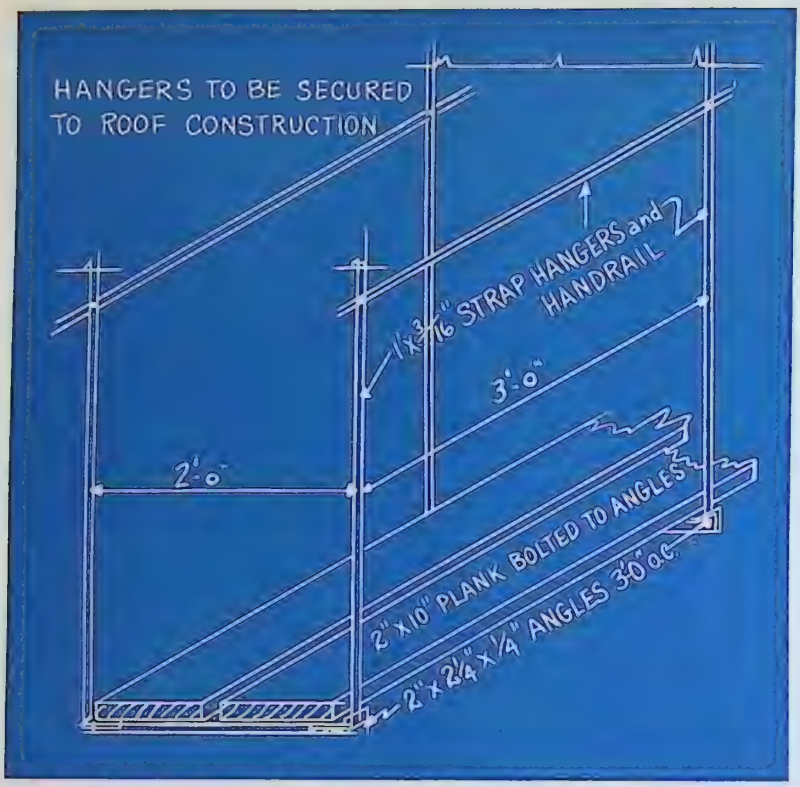


FIGURE 28—*If the theatre has a width between the side walls greater than 60 feet, the structural design will include trusses for the roof and the suspended ceiling below. This space then becomes available for the ventilating ducts and electrical conduits for the lighting in the auditorium ceiling. A system of catwalks, hung from the roof, should be installed to make various parts accessible.*

SERVICE ROOMS

Too often in planning a theatre little thought is given to necessary spaces required for servicing, storage and managing the theatre. These are areas which the public does not have access to but which are just as essential to a properly operated theatre as the public spaces. They include the manager's office, cashiers' locker room, ushers' locker room, cleaners' room, sign and lamp storage, electrical control room, janitor's closets, fan and air-conditioning rooms, boiler room and attic space.

Manager's Office

The manager's office should never be less than 10 feet by 12 feet and in the larger theatres should be increased with an outer office and an adjoining assistant managers' or treasurer's office.

It must be kept in mind that the theatre manager is conducting a big business with long hours, preparation of numerous forms, and handling large amounts of cash every day. It is also necessary for him to interview newspaper advertising representatives, vendors, and prospective personnel.

The office should be located so that he is accessible to outside visitors and also to the public area. His office should be connected by means of an inter-communicating telephone with the box office, projection room, door man, assistant manager, treasurer, stage and engineer. The outside telephone should be an extension from the box-office phone with a buzzer from the box office. A buzzer from the door man's station should be provided for emergencies. The floor covering can be carpet, linoleum, or asphalt tile. The walls and ceiling can be of plaster with base, chair rail, and picture mould.

Locker Rooms

Three locker rooms are required, one for the cashiers and uniformed female help, one for the ushers and uniformed male help, and one for the cleaners.

These rooms should be large enough to accommodate a locker for each person using the room, a dressing bench and mirror. Lavatories in these rooms are desirable.

Structural glazed tile for the walls of these rooms eliminate plaster and painting, and costly maintenance. Since these rooms will probably be in the same area, structural glazed tile for the partitions can be used, with both faces glazed for the dividing partitions. Floors should be covered with linoleum or asphalt tiling.

Cleaners' Rooms

The cleaners' room is for the use of the cleaning women who generally work at night and are on duty only when the theatre is closed. This room should be finished similar to the locker rooms, and should have in the room or in a store room adjacent, storage space for pails, mops, dust cloths, brooms, and the like.

Janitor's Closets

Janitor's closets with slop sink and storage shelves should be located on each level where mopping is required. The use of glazed structural tile is also recommended for these spaces.

Letter and Lamp Storage

The sign letter and lamp storage room should be located as near to the front entrance as possible.

The average theatre has a font of about 500 changeable letters for the attraction signs, with probably only about 50 percent being used in the sign at any one time. Storage cabinet with letters filed in order should be provided. If the storage room is accessible to the front entrance, the cabinet can be on rubber-tired casters so the entire stock of letters can be quickly moved to the sign location when it is required to change the copy. No finish is required on the walls and ceiling of this room, but masonry joints should be struck.

The lamp storage section should be divided off by a strong wire screen with locked door for safekeeping of the lamps. It is necessary for the theatre to keep on hand at all times, lamps of all wattages and colors used for interior lighting and exterior signs.

Electrical Control Room

The electrical control room should be of sufficient size to accommodate and afford easy access to the general lighting panel, the emergency lighting panel, the sign lighting panel, and in certain instances, the power panel.

If a storage battery type of emergency lighting source is used, additional space will be required for the storage batteries, racks and trickle charger.

This room should be located near the front of the house to reduce the length of branch circuit runs and to eliminate local switching for the lobby and foyer lighting. If so located, it can also be used for the storage of standee posts and ropes.

Boiler Room

The location of the boiler room will be contingent, of course, on the general layout, also in some instances on the type of soil which may be encountered in the excavation. Where considerable water pressure is expected, the boiler room floor should be kept at as high a level as possible.

When the main heating load is to be produced by indirect coils and the heat distributed by a system of blower and ducts, then the boiler, fans, and coils should be, if possible, in adjoining spaces, either side by side or the fan and coils immediately above the boiler, to simply and reduce the cost of piping.

One thing to consider in the location of this equipment is the fact that if indirect heating is used for the main auditorium and other places, it will be necessary to install direct radiation in the toilets, office, and other locations where some heat is needed when the main fan will be shut down, to prevent freezing of water pipes and the like. Other considerations in locating the boiler room will be the effect of the necessary flue on the general appearance of the main elevation, and the accessibility for delivering coal or oil.

Even though it is contemplated to use fuel other than coal, provisions for a coal bin, either present or future, should be incorporated in the plans. This necessity was brought home very vividly to many owners during the war when theatres were required to change from oil to coal, or go out of business.

The boiler room should have sufficient floor area to permit the installation of the boiler and its appurtenances, the hot water heater, pumps, and so forth, and still leave room all around the boiler for accessibility for the necessary firing and care such as ash removal, cleaning flues, and the like.

The wall of the boiler room, immediately in front of the boiler, should be at a distance great enough to permit the easy replacement of the boiler tubes.

The boiler should never bet set in a pit below the floor, but the floor should be level and the ceiling of ample height to clear the boiler, the pipe header above, and so forth.

A floor drain should be installed connecting to the sewer, through a sump pump if necessary, to keep the floor dry and to permit "blowing off" the boiler.

If coal is to be used as fuel, provide an ash hoist conveniently located. Provide a fresh air intake from the outside air to provide sufficient oxygen for combustion, either by means of a duct or grilled window which can be opened. This opening should not be less than 18 inches above the outside grade, especially in localities which are subject to heavy snowfalls.

The entrance to the boiler room should be equipped with a self-closing tin clad Underwriters'-approved door with channel iron frame, and opposite the entrance there should be an emergency exit leading direct to the outside. An iron ladder for access to this emergency exit is satisfactory.

The boiler flue should be lined with fire brick set in fire clay to a point not less than 20 feet above the level of the breeching. Provide a cast iron thimble in the flue for breeching connection, and cleanout door and frame at the bottom.

Mechanical Equipment Room

The size of the mechanical equipment room will be determined by the type of air conditioning, if any, and the ventilating fan, and other items. If air conditioning is to be installed, the equipment will include supply and exhaust fans, condensing unit, heating and cooling coils with their sheet metal enclosures, perhaps an air washer and evaporative condenser. An air compressor may also be required for the control system, and in some cases a deep well pump when well water is used for condensing purpose, or to take the place of the condensing unit.

It is sometimes expedient to locate part of this equipment such as the fans and coils on the same level, adjacent to the projection booth, with the condensing equipment located directly below. The cooling coils, however, should not be located at too great a distance from the condenser for the most efficient operation.

If this room is located at the basement level, it will also be the best location for the sump and ejector pumps if both or either are required. Floor drains should be conveniently located near the equipment.

A small room adjacent to the equipment room is desirable for the electric service equipment, such as disconnect switches for the power and light service, current transformers, meters, meter loops, and so forth, in accordance with the requirements of the local service company.

The Attic

If the theatre has a width between side walls greater than 60 feet, the structural design will include trusses for the support of the roof and the suspended ceiling below. This space then becomes available for the ventilating ducts and electrical conduits for the lighting in the auditorium ceiling.

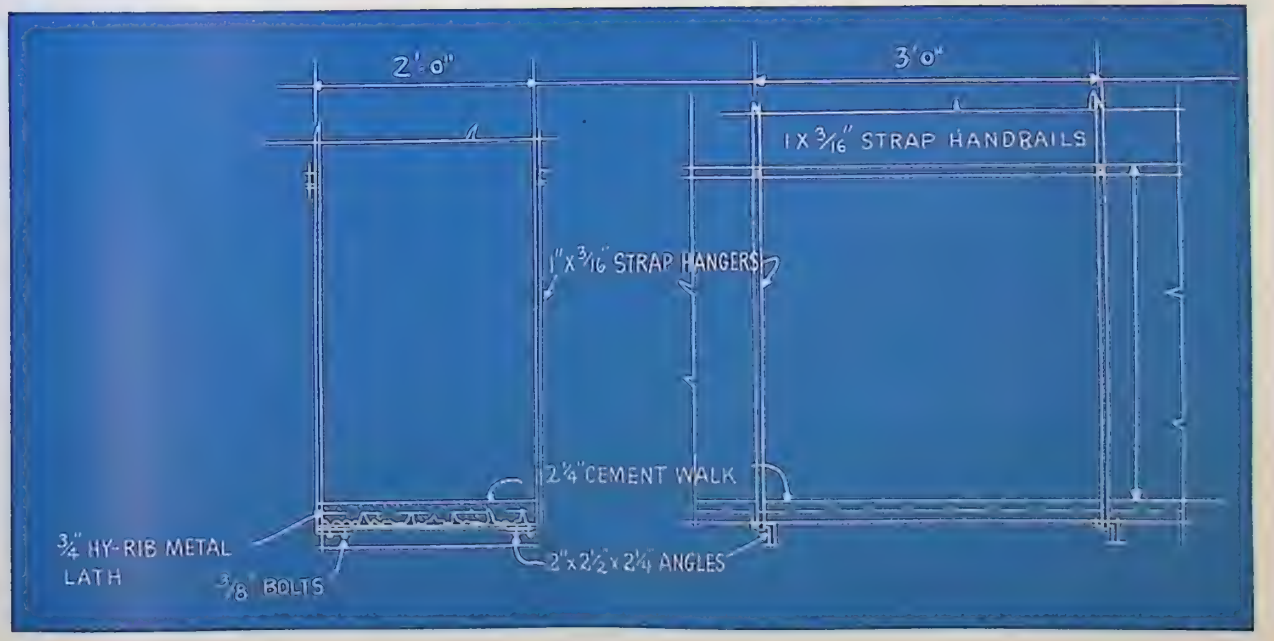
Since the ducts will be equipped with dampers for adjusting the ventilating system, the electrical disconnects, and perhaps winches for the auditorium fixtures, a system of catwalks should be installed to make these various spots available. This will preclude the necessity of walking on the furring and the resulting possibility of breaking through the finished plaster ceiling. The catwalks should be hung from the roof structure and can be constructed with strap hangers, angle iron ledgers with plank walks, or if required by the code or Underwriters', the walk itself can be of concrete on hy-rib metal lath. (See Figures 28 and 29.)

Provision should be made for ventilating the attic space to remove accumulated heat which will occur in the summertime. Louvres at each end of the attic space, close to the ceiling, with gravity ventilators through the roof will relieve this condition. The louvres should be equipped with shutters to permit airtight closing during the heating season.

The access to the attic space should be as convenient as possible with a tight-fitting door or hatchway. If it is necessary to resort to a vertical ladder and hatchway, the hatchway cover should be counterbalanced and platforms provided immediately adjacent.

Lighting should be provided in this space with control switch at the entrance.

FIGURE 29—The catwalks should be hung from the roof structure and can be constructed with strap hangers, angle iron ledgers with plank walks, or, if required by the code or Underwriters, the walk can be of concrete on hy-rib metal lath. Provision should be made for ventilating the attic space to remove accumulated heat which will occur in the summertime. Louvers at each end of the attic space, close to the ceiling, with gravity ventilators through the roof will relieve this condition. The louvers should be equipped with shutters to permit airtight closing.



Construction of Motion-Picture Exchanges

Notes on the Design and Space Requirements As Put in Practice in New Warner Buildings

J. E. Schwarz

Early in the year of 1944 Warner Brothers Pictures Distributing Corporation instituted a program for the construction of new film exchange buildings in many of the exchange centers throughout the country.

Just prior to the war new buildings had been erected in Pittsburgh, Los Angeles, and Milwaukee, each showing some improvement in layout, use of materials, and so forth.

The program in this country was to include Boston, New Haven, Cleveland, Indianapolis, Minneapolis, Seattle, Memphia, St. Louis, Dallas, New Orleans, and also the remodeling of the exchanges in Chicago and Kansas City.

Everyone concerned in the selling, distribution and handling of film was consulted as to the requirements for each locality, the general layout, materials, and type of building required, from which a set of standard outline specifications was developed.

These specifications called for a building which would be efficient, economical to operate, and maintain, have the lowest applicable insurance rate, and still be a credit to, and an advertisement for Warner Brothers' Pictures.

The specifications also provided for comfortable, well-lighted private and general offices, large and efficient facilities for the stocking and selling of advertising accessories, large clean toilets and rest rooms, club rooms for the employees, and, in some cases, preview rooms.

The film handling section of each building was designed to accommodate the territory which it served, with the number of film vaults varying from five to twelve, a special shipping vault, and with the main shipping room and inspection rooms designed to handle the incoming and outgoing film with the greatest efficiency.

In addition to the above sufficient space and facilities were provided for the storing of the large volume of old records which must necessarily be preserved in this particular business.

Provided also were complete year-around air-conditioning systems for the entire working areas, which on account of the different occupancies in this type of building, were zoned and separately controlled for the different sections. It was felt that such expense was justified not only on account of customer's comfort but also on account of lower turnover of employees, which is also the reason for incorporating a club room in the scheme, with complete electric kitchen and other conveniences. The necessity for these facilities was recognized due to the fact that zoning regulations confine the location of this type of hazardous occupancy building to certain sections, which are not attractive and do not have lunch or other facilities in the neighborhood.

Low cost maintenance was insured by the use of alumlited aluminum for all exposed interior and exterior metal work, ceramic glazed tile for interior walls and partitions, enameled perforated metal acoustical ceilings, face brick walls in shipping and inspection rooms, and all corners in these last two areas protected with angle iron guards.

Flush troffer fluorescent lighting was specified for all office spaces designed to produce at least 35-foot candles over the entire space at desk height without shadows.

The private offices for the branch and district managers have wood paneled walls from floor to ceiling, acoustical ceilings, carpeted floors with private toilets and closets, and built-in cabinets for their records.

The exteriors are designed with face brick on the street fronts, polished granite base and entrances, glass block panels with alumlited aluminum trim, with particular attention paid to weatherproofing by the use of copper counter flashing, through-wall copper flashing under all copings, and spandrel flashing. Thermal insulation is provided over the entire roof area with spray piping for the condenser water where evaporative condensers are not used.

Concealed radiation on the exterior walls is used to take care of the glass exposure, with panel heating in the walls of the inspection rooms as a safety measure.

Although the construction program on these exchanges is being held up in part on account of present costs the few which have been built are, without doubt, the finest exchanges in the country, and reflect the type of product being handled in them, and will no doubt set for the future a higher standard for this particular type of building.

In every location sufficient property was acquired to provide for future expansion, and also for truck loading space off the street, and fenced parking space for employees and exhibitors.

THE MINNEAPOLIS EXCHANGE represents an example of a two-story building, where vaults, shipping room, inspection room, and poster rooms on the street level and, on the second floor, the general offices and the club room. Here are indicated the type of materials used in these buildings.



THE NEW HAVEN EXCHANGE represents an example of the one-story building, where all activities are conducted on the one level. The materials in new buildings include granite, glass block, and aluminum. E. C. A. Bullock was the architect for the Minneapolis and New Haven buildings.





THE PHILADELPHIA EXCHANGE had W. H. Lee as the architect. The specifications called for the building to be efficient and economical to operate and maintain, have the lowest applicable insurance rate, and still be a credit to the company and an advertisement for Warner Brothers Pictures.



THE GENERAL OFFICE SPACE of the Philadelphia exchange shows the typical interior, indicating the extensive use of glazed structural style, asphalt-tile flooring, and flush, continuous trofter lighting. The pneumatic tubes connect with the shipping room at the rear of the first floor.



THE VAULTS have adequate trucking space (above). The walls of the room are faced with brick with the corners protected with angle guards. Inside the Philadelphia vaults (right) are the film racks with dividing partitions. The sprinkler system installed utilizes baffled sprinkler heads.



THE INSPECTION ROOM shows the proper spacing of tables, general lighting, face-brick walls, and the large center space for efficient trucking of film to and from the inspectresses. The Philadelphia design is to make a pleasant working space, not a forbidding barn-like room frequently seen.

THE CLUB ROOM, in the basement of the Philadelphia exchange, has a fully equipped "kitchen in a cabinet," with hot and cold water, electric stove, sink connections, and refrigeration. Similar facilities are included in all the newer exchanges for the convenience of the employes.





Plastics and the Modern Theatre Interior

Long-Range Economy and Sympathetic Beauty Achieved Through Proper Plastics Materials

MORRIS SANDERS
Architect

It is interesting to remember, as one walks into a handsome theatre, brightly and handsomely furnished with the newest and best in interior finishing materials—plastics—that the film industry and the plastics industry both sprang from the same source. For they did and that single source was celluloid, the development of John Hyatt in the 1870's.

Today, photography's dramatic offspring, the movies, has come a long way, but it still finds the plastics industry serving its broadening needs—with a remarkably varied group of man-made materials.

Today's theatres, like those of the past, must have personality, attention-commanding design. Unlike the theatre of yesterday, today's theatre must be especially easy of upkeep, resistant to rough usage and wear. With labor at a premium and an economic existence based upon large and frequent turnover, the durability of theatre interior construction and decoration is as important as distinctive beauty and comfort.

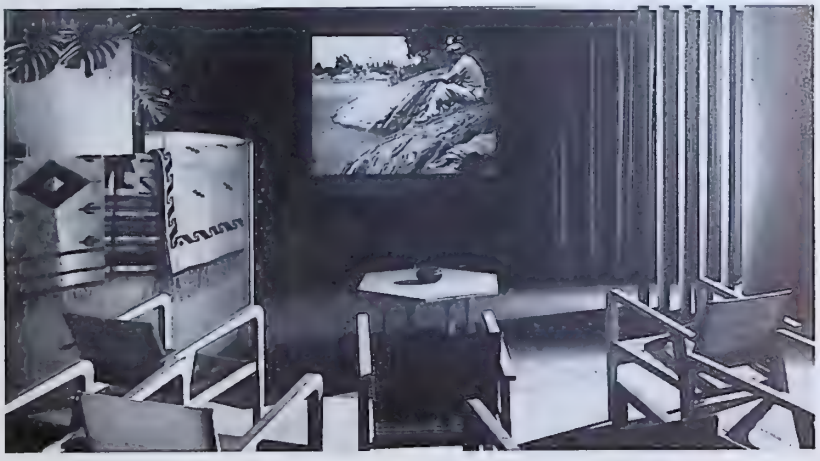
Fortunately for the theatre owner and the public, well-chosen plastics materials provide both advantages—those of long-range economy and of sympathetic beauty. Although plastics occasionally serve the theatre proper in the forms of flexible seat coverings, molded arm rests, and stage decorations and props, they seem to be their best in the public rooms—in the foyer, the lobby, and the lounge.

For it is these lighted public areas that must give the public an atmosphere worthy of the performance, convey a feeling of comfort and well-being, and, at the same time, take a tremendous amount of steady traffic and the abuse that goes with it.

Plastics — and laminated plastics in



A LITTLE THEATRE in a private home is equipped with modern chairs of blonde wood with Saran fabric covering of canary yellow, green, and blue. (Photograph Dow Chemical Company.)



FACING THE SCREEN in this same theatre-in-a-home, is caught another view of the Saran-covered chairs. The striped covering is in a multi-color roman stripe. Saran is, chemically, vinylidene chloride, a plastic possessing remarkable resistance to acids, chemicals, and even water. Lumite is a Saran fabric made by Chicopee Manufacturing Corporation. (Photograph of Dow Chemical Company.)

THE AUDITORIUM at the Dow Chemical Company, where lectures and technical classes are held and musical events take place, has its chairs upholstered in Chicopee's Lumite in parrot green, making an effective appearance with the high-gloss black wood. Saran fabrics can be adapted to many types of furniture, with special patterns being developed for special uses. (Dow Chemical Company photo.)



THE 350 CHAIRS in the studios of WABD, New York television station, are upholstered in Lumite woven plastic fabric in antique green. (Photograph of Chicopee Manufacturing Corporation.)



particular—are peculiarly fitted to answer any wall-surfacing and cabinetwork problems in these areas. Their color and design possibilities (whether inlaid or applied) are literally unlimited; they have few equals in their resistance to abrasion and normal wear and tear, and they have no equals when the field of competition is limited to materials with "touchability" and warmth, that is, organic materials.

Besides offering quality laminates (such as Formica), where opaque, decorative, and highly protective surfacing is required, plastics provide a wide variety of unique translucent and transparent materials. Thanks to acrylics (Lucite and Plexiglas), and to cast phenolics (such as Catalin), a lobby or other public theatre area can be as gaudy as a juke-box or as chaste as a crystal chalice.

Literally, any mood is possible when plastics and lighting are combined by a good designer.

Plastics are perhaps less recognizable in their role of floor surfacing. The new vinyl flooring materials look much like rubber; their color range may be wider —but, otherwise, they seem hardly distinctive upon casual examination. Their outstanding virtues—great resistance to oil and wear—will, however, endear them to the theatre owner whose concern with maintenance matches his interest in appearance.

There are other star roles that plastics can play in the theatre. There are no more desirable and colorful seat covering materials than those provided by the plastics industry. Whether imitative of leather or original in texture and color, whether extruded in sheet (such as vinylite) or in fine filament (such as Saran), plastics look at least as well as any known "natural" materials and do so indefinitely.

The molded thermoplastics (such as Lumarith) and other molded plastics have their specialized places in the theatre scheme. Although seemingly minor, they are important from the same low maintenance and high public relations standpoints. Plastics as colorful, warm hardware, moldings, and lettering—to mention but a few applications—have long been accepted by the theatre owner and his public.

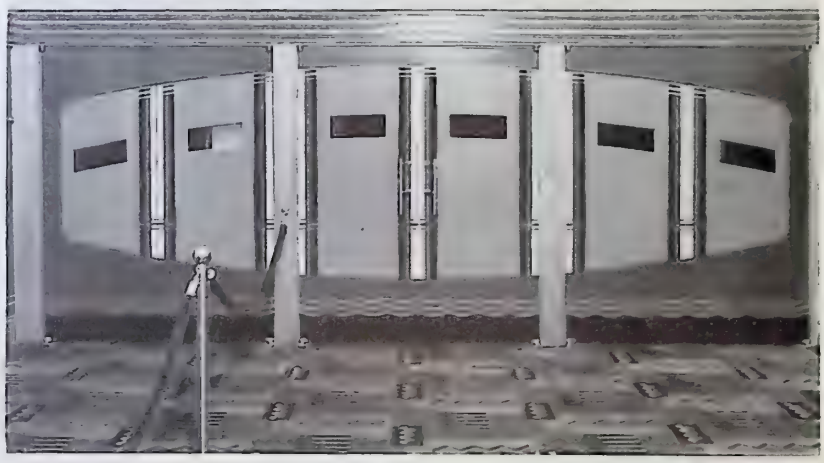
And, recently, the same thermoplastics, in foil and sheet form, surfacing wallpapers and fabrics, have been made available for somewhat informal but (again) permanent decorative wall surfacing. Nor is that the whole story; as high grade paints, as bonding agents, as insulants, as coatings, we find the plastics industry serving the film industry through its consumer outlets just as satisfactorily as it serves its production departments.

But like the name "movie," the name "plastics" is no easy password to quality. The field is broad, the products many. The theatre owner who enters it can suit his needs perfectly but he is well-advised to work his own specialized problems out through an informed architect or designer. He should, furthermore, consult with plastics manufacturers who have had actual experience in his field and in those comparable to it. He will find his efforts well repaid in terms of long-lasting beauty.





TWO OF THE LAMPS shown at the New York Lamp Show indicate some of the late designs which might find use in powder and lounge rooms. The shades are of Lumarith. Real wild flowers were pressed into the plastic (left) by the Woodland Art Company, while Van Cleff held to more orthodox treatment (right). Lumarith is a cellulose material. (Photograph of Celanese Corporation of America.)



THEATRE ENTRANCE DOORS, designed by John Eberson, utilize laminated plastics of the Formica Insulation Company. Such materials are valuable where opaque, decorative, and highly protective surfacing is required. By selecting materials and employing inlay techniques, effective designs can be made for any situation which may be encountered. (Formica Insulation Company photograph.)

OTHER USES of Formica are shown in the pictures below. At the right are seen toilet-stall doors made from the material, and at the left is a public stairway, designed by Raymond Loewy, which utilizes Formica on the walls. Here is further emphasized the value of such laminated plastics as these where hard usage is the rule and not the exception. (Photographs Formica Insulation Company.)





Use of Fiberglas Materials in the Theatre

Many Forms of the Fire-Proof Glass Product Employed for Decoration as Well as Utility

TYLER S. ROGERS
Owens-Corning Fiberglas Corporation

Theatre owners and operators have been singularly fortunate during the past few years while a series of disastrous fires has swept hotels, night clubs, and other places of public assembly. While congratulating themselves on their good fortune, however, it is well for them to bear in mind that these fires have all shown that, regardless of the construction of the building itself, no building is fire-safe if it is filled with highly combustible materials.

An open hearth furnace is a fire-proof structure, but no one in his right mind would choose it as a place to relax. A fire-proof building filled with flammable materials will burn almost as fiercely as the open hearth, once a fire gets well started. Fire-proof buildings will not burn down, but they do burn out, and their unfortunate occupants are not likely to attach much importance to the distinction.

Most buildings in which large numbers of people congregate are filled with a great variety of materials that are more or less combustible. Only by reducing this combustible content is it possible adequately to safeguard human life. No single sweeping measure—the replacement of no one combustible material by a non-combustible material—will wholly solve the problem, but any measure which will reduce the overall combustible content is a step toward true fire safety.

FIRE-SAFE FABRICS

Flammable drapery and upholstery materials are among the greatest fire hazards in structures sheltering large numbers of people. Developments that can help eliminate these hazards are expansion of the line of decorative fabrics woven of non-combustible Fiberglas yarns, the production of Fiberglas-asbestos and Fiberglas-cotton decorative fabrics, the availability of coated Fiberglas upholstery fabrics, and a new upholstery filler consisting of resilient Fiberglas fibers in blanket form.

The fabrics woven wholly of Fiberglas yarns, and of Fiberglas and asbestos yarns, are completely non-combustible and require no subsequent retreatment to maintain their permanent inability to burn. The fabrics woven of Fiberglas yarns and flame-proofed cotton yarns are highly fire-resistive so long as the flame-proofing agent in the cotton remains effective, as shown by fire tests made by the Board of Standards and Appeals of New York City.

The Fiberglas-cotton fabric was brought in contact with the flame of a Bunsen burner for a period of 12 seconds. No flashing occurred on the lengths of the test specimens. After the flame was withdrawn, the average continuation of flaming usually observed was non-existent. The average continuation of glow at the edge of the area in which the cotton yarns had charred was less than 14 seconds and the glow was confined to the charred area.

The objective in developing Fiberglas-asbestos and Fiberglas-cotton decorative fabrics is to provide new types of fabrics possessing highly desirable properties that no one textile fiber can provide alone. In the Fiberglas-cotton combination, for instance, the cotton fibers make possible unique color and print effects. The Fiberglas fibers reduce the potentially combustible content of the fabrics, make possible unusual design effects by selective dyeing, and greatly increase tensile strength. They are also responsible for the high dimensional stability of the fabrics, which makes it possible for draperies to be cut and sewed to their required finished dimensions, without risk of stretch after hanging.

UPHOLSTERY FABRICS

Vinyl-coated Fiberglas upholstery fabrics are designed for use in places of public assembly. Available in a variety of colors, these fabrics will not burn, are highly wear-resistant and can be cleaned by wiping with a damp cloth. They will protect a flammable filler material from a carelessly dropped cigarette, or other source of fire. They are designed to prevent the filler from flaming or propagating fire in surrounding furniture or floor covering, even if the filler should be ignited by intense heat.

FILLER MATERIAL

A non-combustible filler material, consisting of Fiberglas superfine fibers in blanket form, has recently been developed, primarily for seat and seat-back cushions in public conveyances. Further development may lead to use of this filler in theatre seat cushions, thus providing both an unburnable fabric and filler for such upholstery use.

ACOUSTICAL MATERIALS

Fiberglas acoustical tile provides a non-combustible ceiling of high sound absorbing value, at low cost. The tile can be cemented to a solid backing, nailed to wood furring strips, or attached to metal furring strips. Painted white at the factory, the tile has an original light reflection coefficient of not less than 0.75.

A Fiberglas acoustical board is also available for use with recessed-type fluorescent light troffers to form a low-cost, suspended, sound-absorbent ceiling. The board is simply laid between continuous troffer rows. Like the tile, it is painted white at the factory and has an original light reflective coefficient of not less than 0.75.

ON THE SIDE WALLS of the auditorium of the Madison Theatre, Covington, Kentucky, is Fiberglas fabric done in a tropical pattern of blue on rose-ash. It is laid over an acoustical material. The stage curtains and valances are of Fiberglas fabric in alternate gray and yellow stripes. Such fabrics are, because they are of glass, entirely fire-proof. Thy can now be obtained in a variety of patterns.



The data (Table 1) on the acoustical absorption of the tile and board (1 inch thick) are derived from tests conducted by the official Acoustical Materials Association Laboratory (Riverbank Laboratories). The material was mounted on supports (24 inches on centers) 10½ inches from the boundary surface of the sound chamber.

TABLE 1 — Absorption coefficients of Fiberglas tile and 1-inch board.

Frequency (Cycles)	Absorption Coefficient
128	.67
256	.67
512	.82
1024	.89
2048	.91
4000	.98

The noise reduction coefficient — the average of the coefficients at frequencies of 256, 512, 1024, and 2048 cycles, given to the nearest 5 percent—was found to be 0.80.

ACOUSTI-DECORATION

Decorative fabrics woven of Fiberglas yarns may be used primarily for decorative effect, as in draperies, stage curtains and backdrops; or they may be used as wall or ceiling coverings, backed by non-combustible Fiberglas sound-absorbing materials, for both decorative and acoustical effect. The sound-absorbing materials consist of fine glass fibers lightly bonded with a resin. They are ordinarily installed in a one-inch thickness.

Acoustical values are given in Table 2 for the combination of a Fiberglas sound-absorbing material, and a decorative fabric woven of glass yarns weighing two and three-quarters ounces a square yard, 50 percent gathered (cloth area twice actual area of hung drapery), and spaced 10 inches from the wall.

TABLE 2—Sound absorption coefficients at 512 cycles (value used in making acoustical analysis of an auditorium) and noise reduction coefficients (value used for sound-quieting in such places as restaurants, cafeteria, and so forth) of unbacked and backed Fiberglas.

	Sound Absorption Coefficient (512 cycles)	Noise Reduction Coefficient
Fabric, backed with 1-inch-thick Fiberglas (Code H33, Type A)	.74	.70
Fabric, alone, without backing	.45	.40

Similar values can be assumed for the fabric used as draperies on stages, or hung in open doorways.

INSTALLATION METHODS

A variety of methods can be employed in installing the fabrics and sound-absorbing material. The latter can be nailed to the walls or ceilings or held in place by furring strips; or it can be laid on Fiberglas cord stretched from wall to wall 10 to 12 inches below the ceiling. The third method (illustrated) is particularly applicable to ceilings with through beams and exposed pipes and conduits.



INSTALLATION of Fiberglas materials is a relatively simple procedure. Above is seen workmen rolling out Fiberglas roofing mat in a standard three-ply construction. In the center picture is seen the installation of Fiberglas acoustical board which is laid between rows of recessed fluorescent light troffers. Fiberglas materials are available for acoustical as well as for thermal insulation.

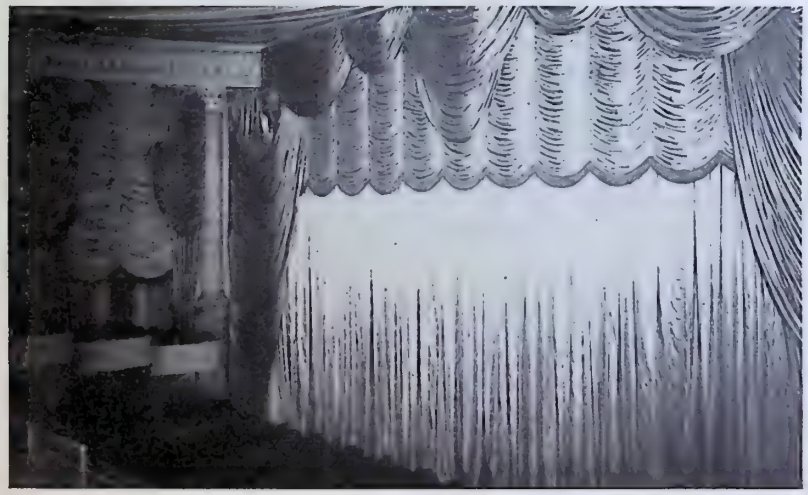


THERMAL INSULATION is used in ceilings (below), walls, floors, and roofs. It cuts fuel costs, makes possible use of smaller and less expensive heating units, and provides closer temperature control. Many uses of Fiberglas matrials in theatres are essentially similar to uses of the materials in other types of buildings and the characteristics can well be applied here in all cases.

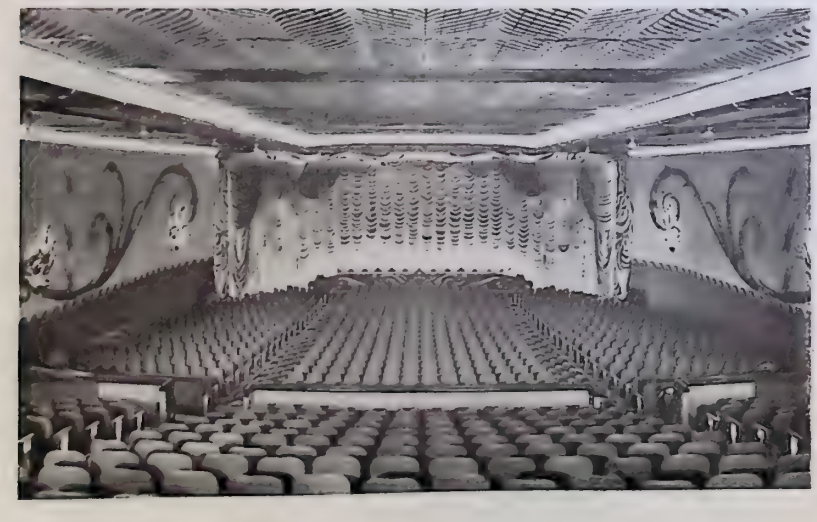




IN OFFICES, Fiberglas fabrics can play a double role, of ceiling decoration and for drapes (above). Fiberglas bats above the ceiling fabric add further acoustic benefits. The contour curtain at the Fox Theatre (middle), Philadelphia, as well as the proscenium and other drapes, are of Fiberglas in magenta, coral, jade, gold, and eggshell. Major attribute of Fiberglas materials is their fire-proofness.



GENERAL VIEW of the auditorium of the Crest Theatre, Long Beach, California, shows the decorative plan. Sound control is provided by using Fiberglas acoustical materials in the walls and ceiling, overlaid by a thin porous Fiberglas mat, and all installed behind a metal grille. The acoustical balance is so good that it is said a normal voice can be heard in any part of the house.



The facing fabric can be stretched flat, pleated or draped. It can be installed in direct contact with the acoustical material, or it can be hung independently of it. A method of installing the fabric on a wall is shown in the pictures. The snap catches make it easy to remove the fabric for cleaning.

ACTUAL INSTALLATIONS

An example of the trend toward use of Fiberglas decorative and acoustical materials in theatres is provided by the Crest Theatre, Long Beach, California, the world's first pre-fabricated theatre. Instead of using plaster in the auditorium walls and ceiling areas, sound absorption is provided by using Fiberglas sound-absorbing material faced with a thin Fiberglas mat, behind a metal grille. Acoustical balance is so good that words spoken in normal tones can be heard anywhere in the house.

Fiberglas acoustical material is installed in the ceilings of the main ramps and cross-over aisles, in the exit doors, and in the ceilings of the men's lounge and lavatory. The ceilings of the ladies' lounge and lavatory are of Fiberglas fabric backed by Fiberlglas sound-absorbing material. Fiberglas is also used for sound absorption in the ceiling of the projection room.

The Madison Theatre, recently opened in Covington, Kentucky, provides another example of the use of Fiberglas materials. Fiberglas decorative fabrics provide the predominant decorative motif. On the side walls of the auditorium area they are laid over an acoustical material, in a tropical pattern of blue on rose-ash. Stage curtains and valances are of Fiberglas fabric in a striped pattern, alternating pearl gray and lemon yellow.

OTHER FIBERGLAS FORMS, USES

Many uses of Fiberglas materials in theatres, even including decorative fabrics and acoustical materials, are essentially similar to uses of the materials in other types of buildings. The heating system of a theatre does not differ essentially from the heating system for a restaurant. In both instances, it has been demonstrated that proper use of Fiberglas thermal insulation in walls, floors, and roof cuts fuel costs, makes possible use of smaller and less expensive heating units, and provides closer temperature control.

Fiberglas roofing mat is available to help provide a weather-proof cover for a theatre, as it is to provide a similar cover for a loft building. Fiberglas in a number of forms, is supplied for the insulation of pipes and air ducts, in whatever type of building the pipes and ducts may be installed. Fiberglas materials are employed for the insulation of electrical equipment and wiring in theatres, as they are for such equipment and wiring in department stores.

Whether in an industrial plant or theatre, the air circulated by the air-conditioning system must be cleaned. Fiberglas air filters, consisting of pads of glass fibers treated with an adhesive, are standard equipment for such systems in all types of buildings. In the theatre, the filters strain from the air the dust and pollen that would otherwise cause audience discomfort, and settle in a heavy film on draperies and upholstery.

Aluminum, Top Material for Theatre Uses

New Products and Pre-Fabricated Buildings Bring Important Features for the Industry

J. T. Underwood
Reynolds Metals Company

Theatre owners, long harassed by the problem of finding a suitable material for the construction of new theatres or the remodeling of existing structures, may now find a solution to their problems in aluminum. This most versatile of metals is adaptable to a large number of applications in the theatre field. And thanks to huge new production facilities, aluminum is now available in almost unlimited quantities and a wide variety of forms.

Aluminum, long recognized as the most suitable material for kitchen pots and pans, is no longer a single metal but is a whole family of metals. To its well known lightness and immunity to rust, new aluminum alloys now add strengths up to that of steel. Too, fabricators are no longer dependent upon a single source of aluminum, so are making it available in many new forms and products, many of which are of exceptional interest to the theatre owner.

ALUMINUM IN THEATRES

To bring you up-to-date, some of the more important developments in this field are briefly described below.

Building Exterior

In all parts of the country and in any season of the year, aluminum has much to contribute to the pleasure of theatregoers. Even the exterior appearance of a theatre finished in aluminum can contribute greatly to the general attraction of the movie. Through the utilization of its basic advantages, aluminum can be a "natural" for theatre applications. Its bright, clean, modern appearance, its immunity to rust, its elimination of painting and expensive maintenance are all important factors. As theatre owners become more familiar with aluminum, more owners will include this metal in building specifications.

Front and Marquee

Theatre fronts constructed of aluminum siding in such forms as corrugated or clapboard will add much to the patron's natural desire to get inside.

Marquees attractively lighted with the many types of light fixtures made from such aluminum products as rolled formed shapes, extrusions, sheet and formed tubing afford real "eye catchers" and help to turn money into the till.

Box Office

Even the ticket booth, "the pay-off," can be made entirely of aluminum. Too, aluminum decorative trim with its permanently bright appearance can add much to the external appearance of the building.

All-aluminum doors, signs, and lettering with well chosen aluminum trim can make an insignificant appearing theatre become the real show place of the town.

Foyer

The foyer of the building can be made cheerful and bright by addition of attractive display cases, such as those shown in Figures 1 and 2, made of aluminum sheet and rolled or extruded structural shapes.

Displays

Aluminum foil used for trimming displays gives that added appearance which can make a display case really outstanding.

The foyer could be handsomely—and profitably—equipped with an all-aluminum soda fountain, Figure 3.

Aluminum ceiling panels, sidewalls, counters, venetian blinds, tables, chairs, booths, window frames and wall tile would blend into a combination just right to make people want to stop for a drink or a snack.

Lobbies

Lobbies where quietness is the prerequisite may be greatly improved by the use of aluminum acoustical ceiling panels. Here aluminum furniture and aluminum lighting fixtures can add immeasurably to that feeling of dignity that goes with the better theatres.

Stairs

Stairs leading from the lobby to the different levels of seating could be constructed with aluminum stair treads, stair nosing, handrails and posts as well as being lighted with an aluminum lighting rail, Figure 4, produced as an extruded rail with place for light sources inside the rail. In addition to serving as a stair lighting rail, this unit can also be put to a number of other uses where controlled lighting is desired.

Lounges, Rest Rooms

Lounges and rest rooms designed to add to the comfort of theatregoers can be made more attractive by utilizing the many advantages of aluminum. Here aluminum ceiling panels such as those shown in Figures 5 and 6, and aluminum

FIGURE 1—Here is an extruded aluminum lighting rail which serves as the framework for a show case and also serves as a light-source container and reflector for new ideas in lighting. Through the utilization of its basic advantages, aluminum can be a natural for theatre applications.

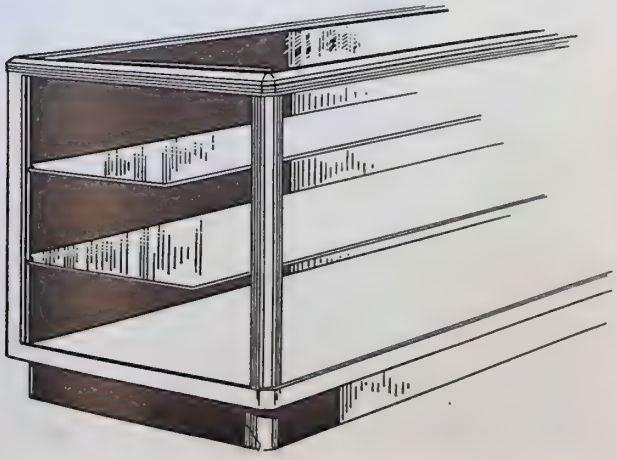
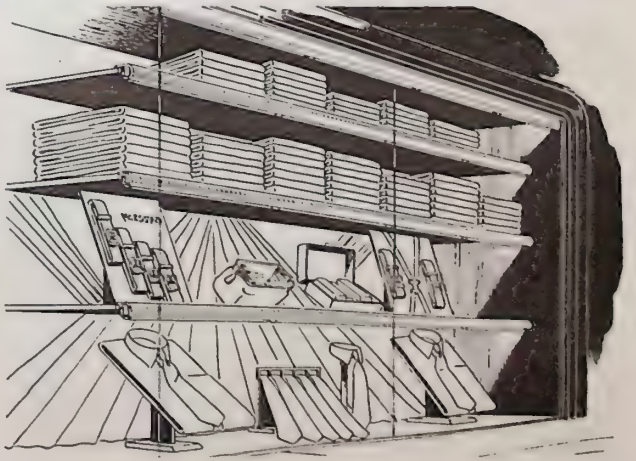
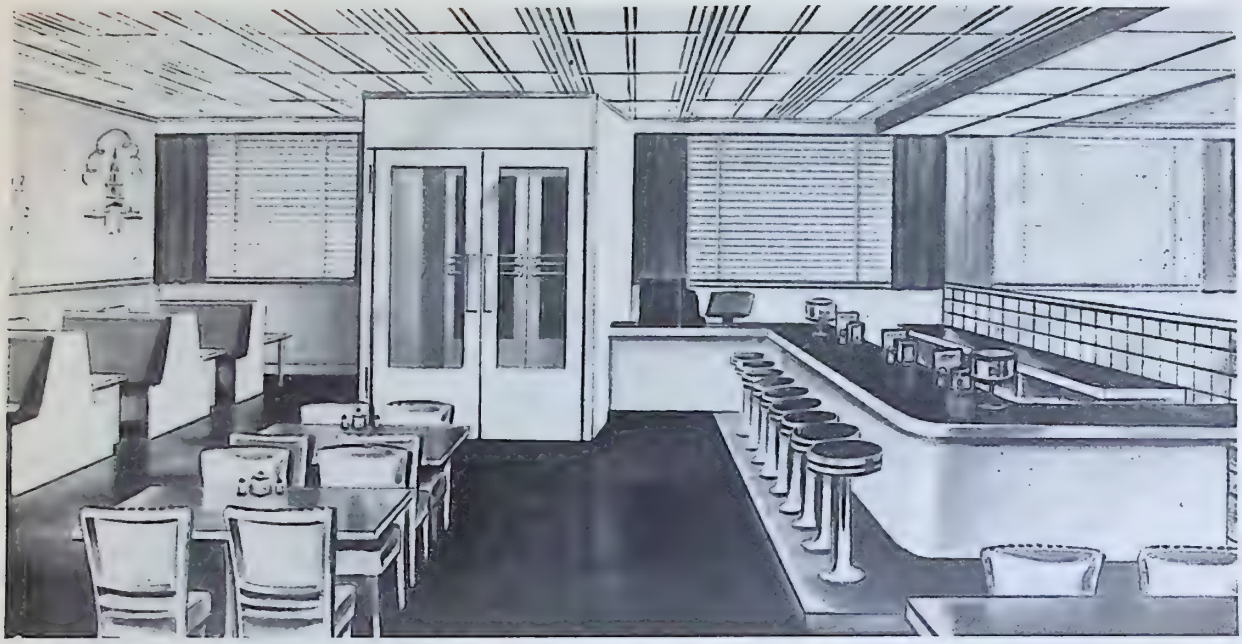


FIGURE 2—New ideas in lighting, using the extruded aluminum lighting rail, may include shelves or other displays employing this highly attractive arrangement. The foyer of the theatre can be made cheerful and bright by the addition of display cases such as this and that of Figure 1.





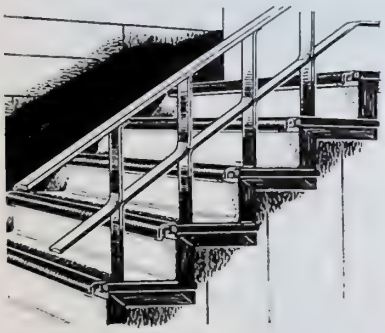


FIGURE 3—A profitable adjunct to many theatres is the soda fountain (above), here utilizing aluminum in ceiling panels, tables, counters, chairs, booths, wall tile, venetian blinds, window frames—all contributing to the attractive bright atmosphere so desired in modern accommodations. Such establishments as the one sketched might be installed in theatre-owned stores adjacent to the lobby, and perhaps even adapted to installation in specially designed cinema lounges.

FIGURE 4—Stair-tread noses (left) employ the extruded aluminum lighting rail to provide ample but unobtrusive lighting in an extremely effective manner. Escalators (right) can also utilize this same idea to advantage. Aluminum is the most versatile of metals in the large number of applications in the theatre field. Thanks to new production facilities, aluminum is now available in almost unlimited quantities and in a wide variety of forms, only a few of which are shown.

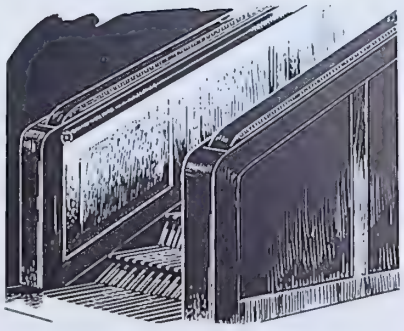


FIGURE 5—Sometimes small spaces, with the help of aluminum ceiling panels, furniture, and other accessories, can be made into extremely attractive lounges like the one shown here. Lounges and rest rooms, designed to add comfort, can be made more attractive by utilizing aluminum's advantages.

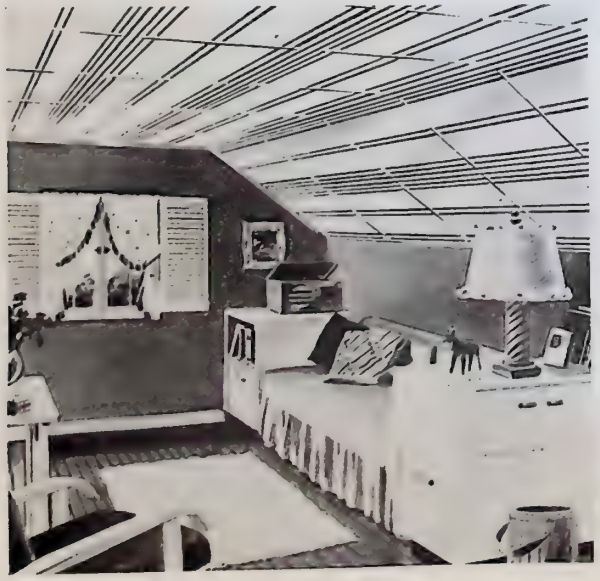


FIGURE 6—Aluminum side walls and ceilings can afford unusual treatments as suggested here. Fabricators of the metal product are no longer dependent upon a single source of aluminum, so are making it available in many new forms and products, many of which are of interest to the theatre owner.

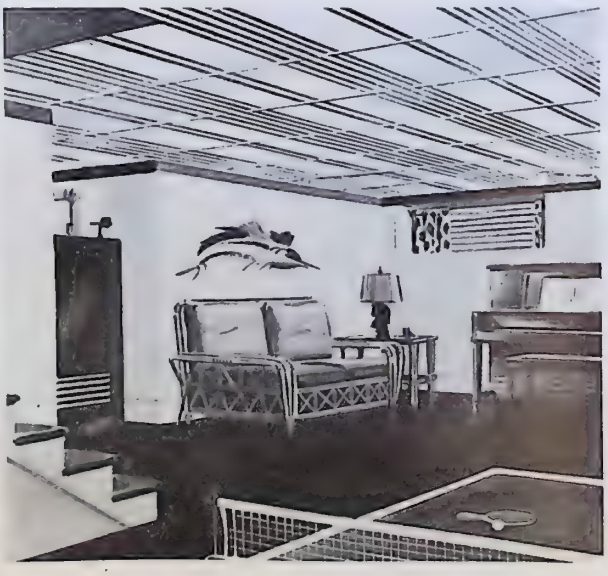




FIGURE 7—Aluminum furniture has that up-to-date, modern appearance, it is easy to keep clean, and it will not warp. With aluminum, no precautions need be taken to prevent disintegrating from rust, since rust, the great enemy of the ferrous metals, does not affect aluminum in the least.



FIGURE 8—Some furniture carries an appeal to rest awhile, but none has a stronger appeal than attractive aluminum lounge items. Aluminum is comparatively a newcomer to the theatre owner, but it can be the solution to some of the many problems that are presently confronting the industry.

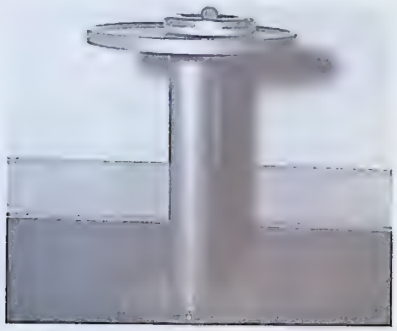


FIGURE 9—A trim aluminum smoking stand affords a welcome addition to any lounge or rest room. It is light, too, and can be moved easily. Any cleaning is no problem for items.



FIGURE 10—Smaller accessories, such as this ash tray of aluminum, can fill many a need about the theatre, and serve further to indicate the extreme versatility of aluminum. Formed aluminum tubing is also being made into many attractive lighting fixtures for floor and wall use. All the inherent advantages of aluminum apply to these uses as well as to those that are pictorially presented.

FIGURE 11—Various patterns are embossed in aluminum sheet for special decorative effects, suitable for decorative trim, special wall or ceiling panels, and the like, to add variety to the decor. Ceiling panels in any or all these four designs can add variety and break the monotony.

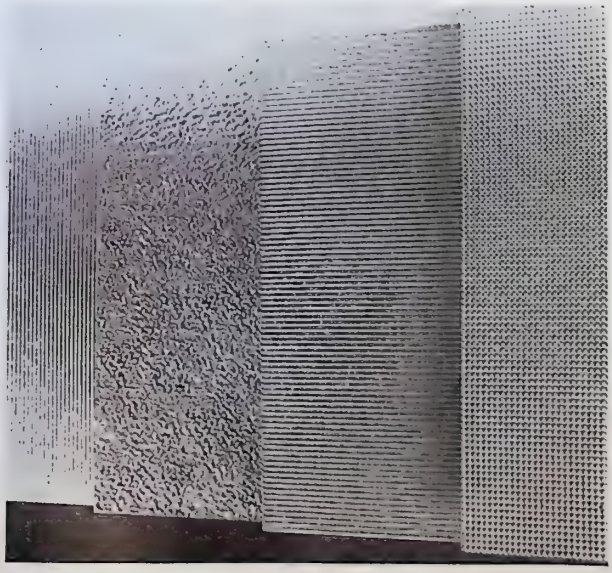
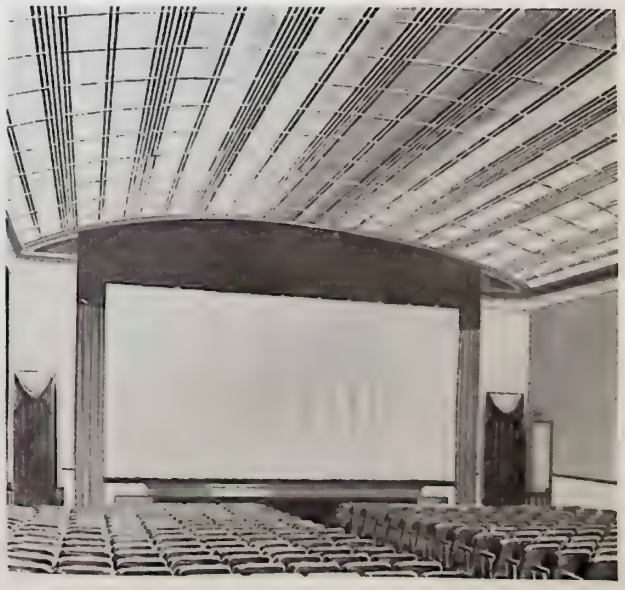


FIGURE 12—Theatre interiors offer many an opportunity for effective use of aluminum, in acoustic ceiling panels, lighting devices, decorative trim, stage equipment, and seats. Aluminum seat standards can reduce the weight floors must carry. Lighting fixtures can be very easily cleaned.



furniture, Figures 7 and 8, give a feeling of genuine restfulness and comfort.

An aluminum smoking stand, Figure 9, and an aluminum ash tray, Figure 10, are welcome and necessary additions to any lounge. These items serve to indicate the extreme versatility of aluminum.

Ceiling panels such as those shown in Figure 11 can be used to give variety to lounges.

Inside the Theatre

The inside of the theatre can employ aluminum in a variety of applications.

Aluminum acoustical ceiling panels, shown in Figure 12, are ideal for any theatre.

Aluminum seats, light in weight, help to reduce the weight which the floor must support.

House light fixtures can be made more effective and can be more easily cleaned when made of aluminum. (Figure 13.)

Aluminum will also be found in many fixtures for the stage lights and footlights.

Aluminum decorative trim also adds much to the interior appearance.

Stage and Booth

Stage equipment that must be moved about can be handled much more easily when made of aluminum.

Much of the projecting equipment as well as all of the projecting booth can be made of aluminum. Spotlight casings would make for light weight and ease of handling.

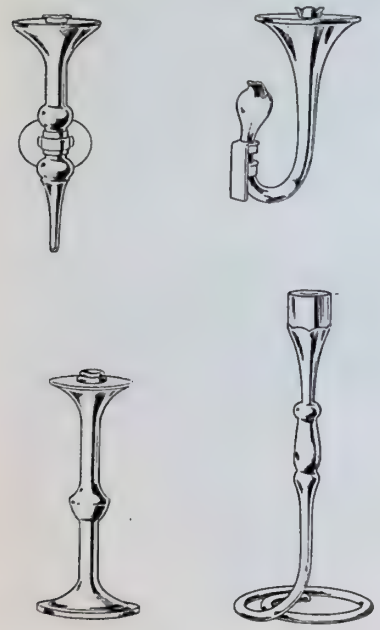
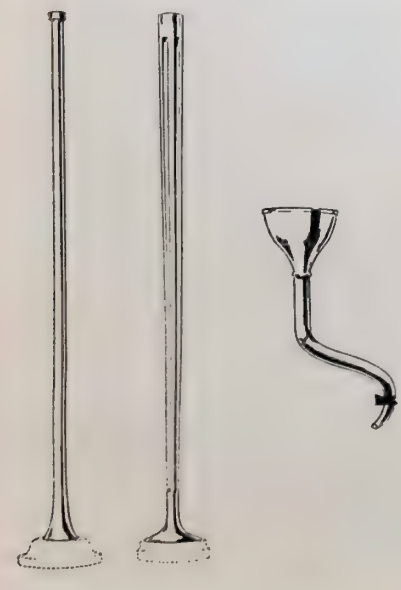


FIGURE 13—Formed aluminum tubing is being made into many attractive lighting fixtures for wall and floor use. In these three groups of sketches are a few ideas of what can be done.

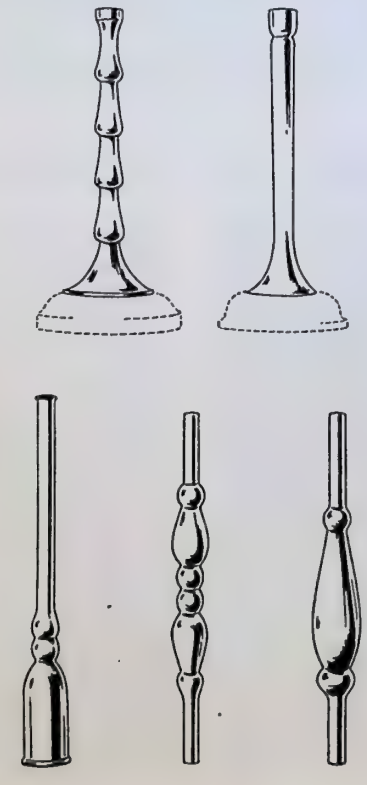


ALUMI-DROME THEATRES

The most practical solution to the problem of building new small theatres is offered in the Alumi-Drome, a standardized, unit type, arch roof, all aluminum, self-supporting, pre-fabricated building, Figure 14.

While the standard size is 36 feet by 60 feet, the Alumi-Drome uses standardized sections 6 feet in length which allow the building to be lengthened to fit requirements, even after in use. Since the individual arch sections are made entirely of aluminum, they are light and can easily be raised into position after being assembled on the ground.

Each of the sections is anchored to a concrete foundation extending one foot above the ground. Any additional height desired can be obtained by using a higher concrete foundation. Several theatres have already been built using the Alumi-Drome on a 10-foot wall, giving an overall height in the center of 28 feet.



The initial cost of the Alumi-Drome is the final cost since the building, made entirely of aluminum, has no parts to rust, rot, or be attacked by termites. This is of great importance since the cost of painting at the time of erection as well as later painting for maintenance is eliminated.

Owners can rely upon this building to go year after year without any maintenance costs whatever because the aluminum will not rot or deteriorate in any manner. It is also fire-proof and when properly grounded, affords excellent protection against lightning.

Since aluminum sheathing can reflect up to 95 per cent of the heat that strikes it, this aluminum building means cooler temperatures in the summer because the sun's rays are literally turned back. In addition the building is easier to heat in the winter because interior heat is likewise reflected back into the building.

OTHER BUILDING MATERIALS

In addition to the Alumi-Drome, a wide variety of aluminum building products may be used in theatre construction or renovation. Aluminum shingles, 5-V crimp and corrugated roofing all make excellent coverings and are simple to apply. With their lighter weight, lighter supporting structures may be used. This also means speedier, easier erection.

Many aluminum rolled and extruded structural shapes are being used in the structural framework and as supports for larger buildings, signs, and the like, where they are proving their value daily. Weatherboarding and clapboard are increasing in value as siding material.

The non-rusting qualities of aluminum eliminate the need for painting at any time. With aluminum, no precautions need be taken to prevent disintegrating from rust because rust, the great enemy of common metallic roofing and siding, does not affect aluminum. With these many advantages aluminum is rapidly coming to be regarded as the logical choice whenever lifetime roofing and siding are being considered.

Heating and air conditioning systems can be made more efficient by use of aluminum sheet for air ducts, which in turn are supported by aluminum structural angles. Cooling units may employ many parts made of aluminum to reduce costs and increase useful life of the equipment. Maintenance costs on such units are virtually at an end when aluminum is used in their construction.

Maintenance costs of present theatres may be sharply curtailed and long years of useful service added by the application of protective coats of paint produced from aluminum pigments. Used as coating for roofs and sidewalls, aluminum paint literally seals the weatherman out —and for keeps, too, because the tiny flakes of metallic aluminum overlap to provide a continuous metallic protective shield. At the same time aluminum paint gives a highly pleasing finish to any building and helps reduce summer cooling costs because of its great reflecting efficiency.

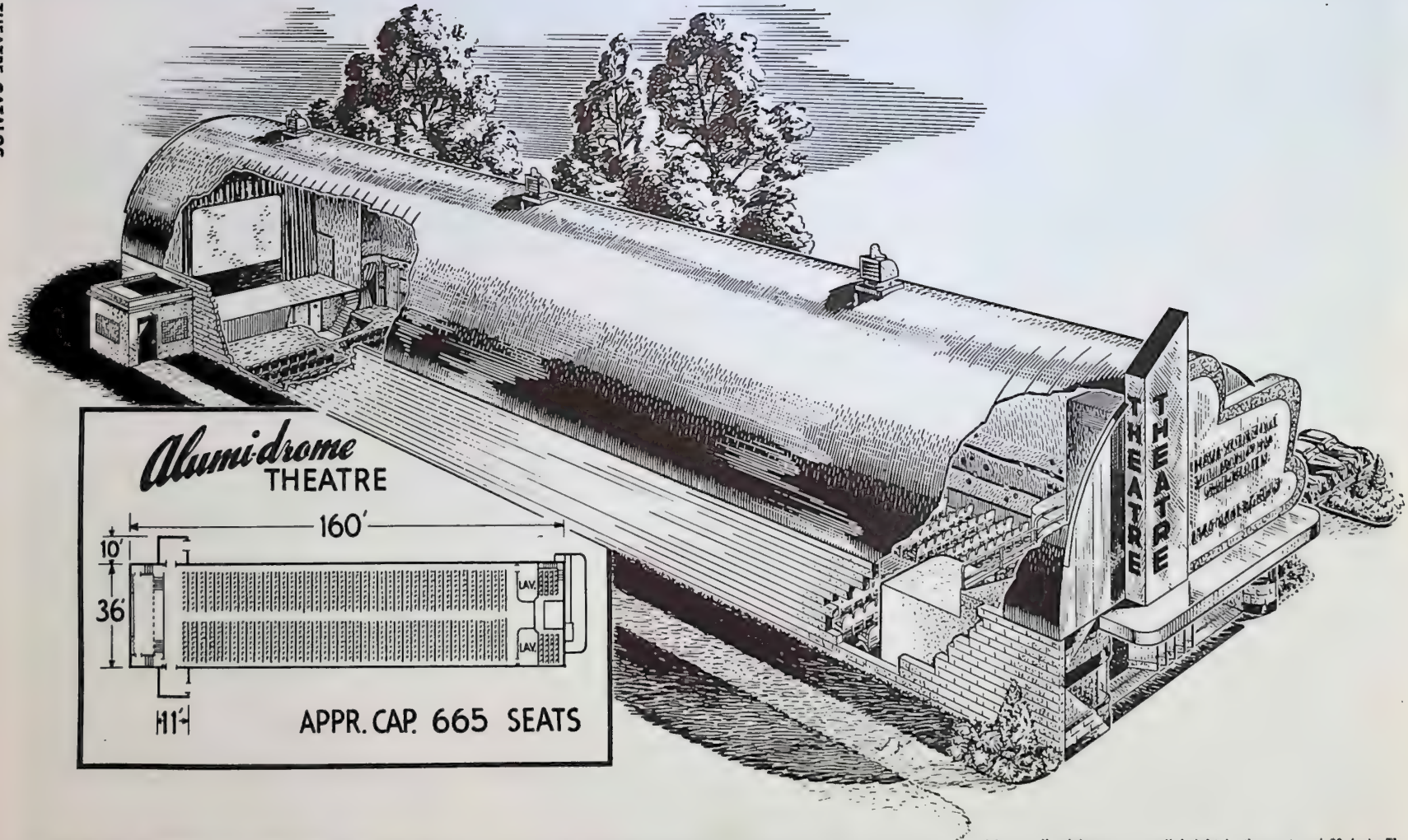


FIGURE 14—The all-aluminum, self-supporting, arch-type Alumi-Drome theatre offers the owner of the small theatre an extremely effective answer to his building problem. It is a pre-fabricated, standardized unit 36 feet wide and 60 feet long, can be extended by adding as many additional 6-foot sections as desired. Each of the sections is anchored to a concrete foundation extending 1 foot above the ground. Any additional height desired can be obtained by using a higher concrete foundation. Some theatres in planning stages use the Alumi-Drome on a 10-foot wall, giving an over-all height in the center of 28 feet. The initial cost is the final cost since the building, made entirely of aluminum, has no parts to rust, rot, or be attacked by termites. Paint costs are also eliminated in the construction of theatres by this method.

Thermal Insulation with Mineral Wool

Operational Efficiency and Patron Comfort Increased through Fire-Proof Insulations

HENRY J. WINGATE
Architectural Engineer

Architects and heating engineers are generally agreed today that the theatre, church, public hall—in fact, any human-occupied building—which does not have thermal insulation is out of date, uncomfortable, and inefficient.

So important is insulation regarded that government agencies, mortgage lenders, fire-prevention experts, and other groups have been urging such protection for many years. Building owners who have applied insulating material in existing structures have found that it results in substantial savings in fuel costs, air-conditioning costs, and generally adds to the comfort of occupants both winter and summer.

THERMAL INSULATION

The purpose of thermal insulation is to retard as much as possible the passage of heat to the outside in winter and to the inside during the hot summer months. Walls and roofs are not designed as heat barriers. Their principal function is to keep out rain, snow, wind and the direct rays of the sun. For that reason, some means must be provided to retard the flow of heat.

Almost any material will offer some resistance to the passage of heat, but those which have the highest resistance—in other words, the lowest conductivity—are naturally the most efficient. Known by architects and engineers as the "k-factor," the conductivity of various materials has been measured scientifically. Those having the smallest k-factor are regarded as the best insulators.

The following table of k-factors of commonly used substances is cited by the United States Bureau of Mines in its latest treatise on insulation (Information Circular, No. 7388, October, 1946):

Mineral Wool	.27 to .30
Cotton	.29
Wood pulp board with plaster base	.30 to .40
Flax fiber	.31 to .33
Sugar cane fiber	.34

For example, engineers have found that 4 inches of an insulating material placed between the auditorium ceiling and roof will lower interior temperatures as much as 15 degrees on hottest days. And in winter the occupied space is more uniformly and comfortably heated with at least a third less fuel.

Numerous theatres and other places of public assembly which have insulation and are air conditioned have reported savings in operating their air-cooling equipment during one season sufficient to pay for the entire insulation job.

It is, however, the saving in fuel costs, combined with increased efficiency of heating plants and occupant comfort, that causes theatre and other public building owners to insulate their structures. Long periods of intense firing of the furnace are not necessary in an insulated structure, according to the Construction Research Bureau, of New York, clearing house for building information. And it removes the cold, clammy feeling so often found in churches, halls and auditoriums which are not used every day and when furnaces are banked a large part of the time.

TYPES OF INSULATION

There are four principal types of insulation on the market: Flexible, fill-type, reflective, and boards.

The fill-type is most generally used in existing buildings, because it can be blown through a hose into the walls and ceiling without upsetting normal routine or creating any dirt or muss.

The flexible type is manufactured in batts, quilts, or blankets, backed with vapor-resistant paper. This finds its greatest use in new construction, being nailed in place between studs or furring strips and joists as the structure goes up. It also is nailed in place in existing buildings where the space to be insulated will accommodate a workman.

Boards must be applied during construction or within accessible spaces, and this is true also of reflective insulation.

Numerous materials are processed in various ways and used as thermal insulation. Among them are wood fiber, sugar cane fiber, cotton, various metals, and mineral wool, which is made from rock, slag, sand, and other materials.

A few manufacturers have recently placed on the market paints which are claimed to have insulating value. These and metal sheets insulate by reflecting heat back toward its source.

The mineral wool and vegetable fiber products derive their insulating properties from countless dead air cells within the fibers and these are the types most commonly used.

Reflective insulation has not received very wide acceptance.

All of the fibrous insulating materials are fabricated into the flexible type. Materials include cotton, balsam wool, other wood and vegetable fiber products, and mineral wool. Of these, only the latter is widely manufactured in loose or granular form to be blown into walls and ceilings of existing structures. It is obvious that the blanket or flexible type cannot be installed within a finished wall. Blowing is the only means of reaching inaccessible spaces.

MINERAL WOOL

No insulation will make a building fire-proof, but some of the materials now in use are highly fire-resistant. Because it is a mineral product, mineral wool cannot burn. National Bureau of Standards tests show that a wood-lath

PRODUCTION OF MINERAL WOOL starts with an ordinary pile of limestone rock and mineral slag or glass. A workman shovels the material into a special cupola or furnace (below). After melting, a jet of high velocity steam hits liquid mass (right) converting it into the widely familiar wooly material.









GRANULAR MINERAL WOOL, used in theatre work, is packed and weighed (above). In this form, the material can be blown into walls and ceilings of any theatre without causing disruption. At the left is seen the removal of the wool bats from the finshing machine. This form also has theatre use.

wall filled with the substance will stop the passage of fire for one hour. Insulation manufactured from cotton, wood, and other vegetable fibers must be chemically treated to resist fire.

Needless to say, fire-resistance is of utmost importance in a theatre or any other place of public assembly. There are numerous cases on record where flames upon reaching mineral wool insulation have been stopped completely or slowed to such an extent that the blaze could be extinguished with comparatively slight damage. The substance is recognized by the administrators of many building codes as an effective fire-barrier and a movement is now under way to obtain lower insurance premium rates for buildings properly insulated with mineral wool.

Mineral wool is the most widely used product for thermal insulation, according to the Bureau of Mines, which states, "Generally, mineral materials are preferable because of their resistance to fire, electrical short-circuits, moisture, termites, vermin, and decay."

Theatres in extremely cold sections of Canada have reported that, where it formerly was impossible to raise the auditorium temperature above 56 degrees with the most intense firing, after insulating the ceiling with mineral wool it was possible to keep the entire auditorium at 70 degrees in 20-below weather with only a pound and a half of steam.

Conversely, air-conditioned theatres have reported that, after insulating, it was necessary to operate the cooling equipment only intermittently with a resulting large saving in cooling costs. Many houses, unable to obtain air-cooling equipment, have installed insulation and found that temperatures were lowered as much as 15 degrees on hottest summer days.

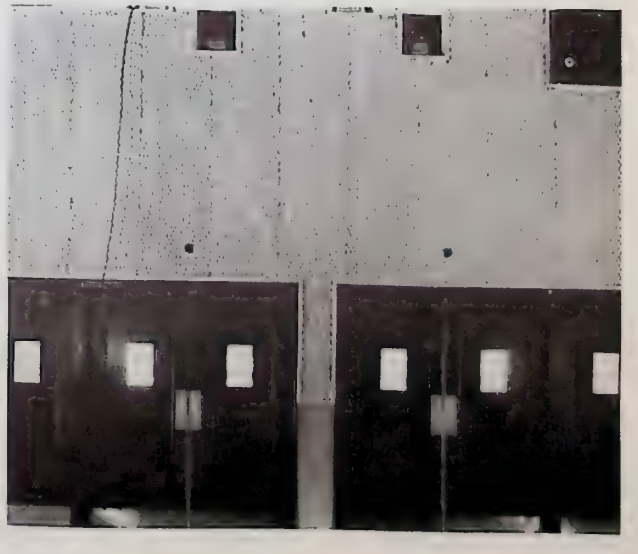
Mineral wool is made by melting the raw ingredients to a liquid state and then drawn from the furnace in a tiny stream. This is broken into minute drops by a high-pressure steam jet propelled through the air. As the blowing process proceeds, fine threads are formed and fall in a fluffy mass. This wool-like substance is then rolled into small pellets for blowing into walls and ceilings and fabricated into the paper-backed batts and blankets.

The substance consists of fine, interlaced mineral fibers having the appearance of loose wool, and the term mineral wool is a generic appellation covering several similar products, differing chiefly by the raw materials from which they are made. "Rock wool" is made from natural rock or from combinations of various natural minerals or rocks, such as limestone and shale. "Slag wool" is made from the blast-furnace slag produced in smelting iron, copper, or lead. "Glass wool" is made from silica sand, soda ash, and limestone, with or without scrap glass, and other materials. All types of mineral wool have virtually the same insulating and fire-resistant properties.

Cost of insulation is not excessive and most building owners find that it pays for itself in fuel savings within three years. An existing structure can be insulated with mineral wool today at a cost no greater than in 1936, due to improved methods of manufacture and application.

INSTALLED IN A THEATRE, mineral wool presents, before decorative materials are overlaid, the aspect shown at the right. Below, granular mineral wool insulation is being blown to full thickness into the area above a theatre roof. Such insulation reduces operating costs of heating and cooling systems.





Construction Uses for Vermiculite Products

Fire Protection Highlights the Advantages Of a Widely Accepted, Versatile Material



VERMICULITE is the generic term for a number of hydrous silicates derived from the alteration of mica. When the material as mined (above, left) is suddenly exposed to high temperatures, the water held between the laminations explodes, turning material into the commercial product (above, left).

Given impetus by the recent stress laid upon fire protection in new construction, vermiculite building materials have won increasingly wide acceptance in the theatre construction field. The extensive research pointing out vermiculite's superiority for the fireproofing of beams, columns, floors, and ceilings has resulted in its wide-spread adoption by specifying architects.

Vermiculite is the basis for a diversified assortment of materials used in building construction. Its high fusion point—2,560 degrees—is far beyond that of many recognized fire-proof materials, including asbestos.

Producers of vermiculite have recently

EXCELLENT MURAL EFFECTS may be obtained by painting (below) over vermiculite acoustical plaster. Fine artistic effects can be achieved without any diminution of the acoustic properties of the material. (All photographs through the courtesy of the Universal Zonolite Insulation Company.)



expanded mine and plant production and overcome many adverse conditions which have caused vermiculite materials to be in short supply. Output of the principal mine in this country, located at Libby, Montana, and operated by the Universal Zonolite Insulation Company, has been more than doubled. In South Carolina, a large area has been given over to mining vermiculite for distribution principally to the southeast. New expanding plants have been established in Albany, New York; Dearborn, Michigan; Chicago, Illinois, and Minot, North Dakota. In all, there are over twenty-five owned and licensed Zonolite brand vermiculite processing plants in this country.

Of principal interest to theatre owners is vermiculite's extreme light weight. Weighing only 6 to 8 pounds to the cubic foot, depending on the grade, vermiculite in its various finished product forms is capable of reducing many tons of dead load in theatre structures. Weight-saving invariably results in lower costs, because of reduced handling and the elimination of costly construction techniques. This fact alone would invite consideration of vermiculite where new buildings or remodelling is contemplated.

INSULATING PLASTER

Perhaps the most quickly evident saving in installation time because of the light-weight characteristics of vermiculite is where the material is used in the making of a fire-proof, insulating plaster. Plaster aggregate made from vermiculite replaces sand, and is mixed with gypsum and troweled on in the same fashion as sand plaster. In many communities, vermiculite has completely replaced sand and is adopted as standard. Vermiculite plaster offers a definite superiority over sand in its sound-deadening and fireproofing qualities.

Weight-saving is especially notable where vermiculite plaster is used to provide fire-proofing of beams, columns, floors, and ceilings. Table 1 shows the resume of fire tests which have been conducted utilizing vermiculite for this purpose.

INSULATING CONCRETE

An equally important adaptation of vermiculite is in its use for the manu-

TABLE 1—Summary of fire tests on walls, columns and beams, and floors and ceilings incorporating vermiculite. (From the Vermiculite Research Institute's "The Contribution of Vermiculite to Fire Protective Construction.")

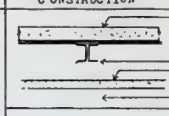
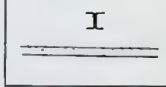
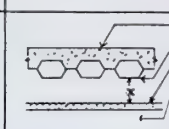
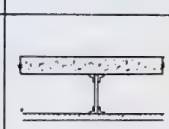
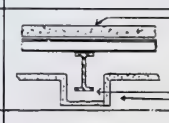
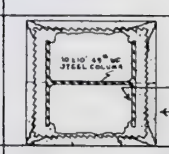
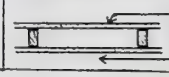
		CONSTRUCTION	Av. T rated time	DESCRIPTION	RATING	AUTHORITY
FLOORS and CEILINGS	Steel Plate Floors			Steel Plate Floor Assembly 2"vermiculite concrete topping. Suspended ceiling 1"vermiculite plaster on metal lath.	4 hrs	Underwriters' Lab. Ret. #2773-9/12/44
				Suspended ceiling of 1 inch vermiculite plaster on metal lath as protection for steel construction. Incombustible construction above ceiling.	4 hrs	Underwriters' Lab. Ret. #2773-1/20/47
				2½" sand concrete topping. Ceiling of ¾" vermiculite plaster on metal lath.	3 hrs	U. S. Bureau of Standards BMS92 Table 44
				As above, except 1 inch vermiculite plaster.	4 hrs	
	Cellular Steel Floors			Minimum of 2" cinder concrete fill. Suspended ceiling of 7/8 inch vermiculite plaster on metal lath.	4 hrs	Underwriters' Lab. Ret. #2689-12/18/39
				Minimum of 2" sand concrete fill. Suspended ceiling 1" vermiculite plaster on metal lath. Dist. x = 4" or more	4 hrs	U. S. Bureau of Standards BMS92 Table 45
				Same as above except distance x, 9" or more.	5 hrs	
	Steel Joist Floors			2" * sand concrete fill ¾" vermiculite plaster on metal lath.	2½ hr.	U.S.Bureau of Standards BMS92 - Table 43 * True average thickness of the concrete fill ½ inch greater than shown due to sag in forms.
				2½" * sand concrete fill ⅞" vermiculite plaster on metal lath.	3 hrs.	
				2½" * sand concrete fill 1" vermiculite plaster on metal lath.	4 hrs.	
COLUMNS AND BEAMS	Beam			Steel "I" Beam supporting floor. 2"vermiculite concrete fill. Suspended protection of 1" vermiculite plaster on metal lath.	4 hrs.	Underwriters' Lab. Ret.#2773-9/12/44
	Beam			Steel "I" Beam Protection Suspended protection of 1" vermiculite plaster on metal lath. Incombustible construction above ceiling.	4 hrs	Underwriters' Lab. Ret. #2773-1/20/47
	Colum			Column protected with 1" vermiculite plaster on metal lath. Lath spaced 1½ inch from column. Space behind lath on flange faces filled with plaster as shown.	3 hrs	Underwriters' Lab. Ret. #2851-1/7/47
WALLS				Load bearing wood stud partition. Metal lath with 3/4 inch vermiculite plaster both sides.	1 hr.	Underwriters Lab. Ret. #2773-8/31/44

TABLE 2—Properties of various mixes (by volume) of Zonolite insulating concrete, including strength in pounds to the square inch and thermal conductivity, and the materials required for one cubic yard of placed Zonolite water-repellent concrete. (From "Zonolite Concrete," published by the Universal Zonolite Insulation Company.)

Mix by volume			Density in lbs. per cubic foot	Strength in pounds per square inch		Thermal Conductivity ("K") in B.t.u. per inch thickness, per sq. ft. per hour, per degree F.	Materials required for one cu. yd. of placed Zonolite water repellent concrete		
Bags portland cement	Cu. ft. Zonolite Stabilized concrete aggregate	Gallons water		Compressive strength 6" x 12" cylinders	Indentation strength 1" disc on 3" x 12" x 12" slab		Bags portland cement	Cu. ft. Zonolite Stabilized concrete aggregate	Gallons water
1	3	10½	38	380	662	1.07	9	27	95
1	*4	13	30	240	357	0.79	6.75	27	88
1	5	16¼	27	150	344	0.69	5.4	27	88
1	6	19½	24	115	166	0.65	4.5	27	88
1	7	22¾	23	95	165	0.62	3.9	27	88
1	†8	26	22	70	121	0.60	3.4	27	88
1	9	29¼	21	50	102	0.59	3.0	27	88
1	10	32½	20	45	75	0.57	2.7	27	88
1	11	35¾	19	32	64	0.56	2.5	27	88
1	12	39	18	25	58	0.55	2.3	27	88
1	14	45½	16	...	...	0.48	1.9	27	88
1	16	52	16	11	28	0.46	1.7	27	88

*This mix ordinarily used for structural roof decks. †This mix ordinarily used for insulating roof fill.



RADIANT HEATING COILS can be laid on vermiculite insulating concrete, an application which, as readers of this volume (1945 edition, pages 375 through 378) can well appreciate, is coming into more and more wide usage. A survey shows that there are now about 1,000 radiant-heat floor installations being put in each month in residential and commercial structures. While an occasional theatre adopts this system, there is no reason why the methods of heating should not become more widespread, with the added advantage to be obtained from the use of vermiculite concrete.

facture of a lightweight, insulating concrete. (See Table 2.) The vermiculite concrete aggregate is mixed with Portland cement and water. In its use, caution should be exercised to secure concrete aggregate which has been produced according to the standards of the Vermiculite Research Institute. This material incorporates an integral admixture which lends conformity, maximum yield, strength, and certain water-proofing characteristics to the finished mix. Vermiculite insulating concrete is extensively used in providing warm dry floors and insulating roof decks. This is perhaps the only method that provides a monolithic insulating floor construction for theatres.

Vermiculite concrete has proved itself very versatile in insulating concrete roof construction. It provides an insulating fill over existing roof decks of concrete, wood, asbestos, steel, or corrugated iron. Or it can be used as a structural deck itself, furnishing insulation and structural strength in one application, through a variety of methods not found with any other material. Structural roof decks of vermiculite concrete may be poured over paper-backed welded wire mesh, ribbed metal lath, or other supporting forms.

The most clearly evident advantages in the use of vermiculite for this purpose are in the reduction of dead load on supporting structural members and its extremely high fire-resistive characteristics. In one 33-story building, floors, columns, and beams fire-proofed in this manner permitted savings in dead load and the use of structural steel of $235,000! This represented only the saving in cost of structural steel; many additional economies were effected in placing, handling, and forming of the material. In lesser amounts, the same economies can be achieved where new theatre construction is planned.

GRANULAR-FILL INSULATION

In theatre construction calling for a granular-fill insulation to prevent heat loss in loft and side-wall cavities, vermiculite affords the same fire-proof protection as has been previously described.

Many graphic illustrations of the fire-resistance of granular-fill vermiculite can be pointed out. An egg, placed in the center of a coffee-pot filled with vermiculite, can be left for an hour in a hot oven, removed, and found to be raw. A penny placed on a small pile of vermiculite in a man's hand can be melted by blow torch without injuring the holder.

And vermiculite, being all-mineral, is rot-proof and vermin-proof.

ACOUSTICAL PLASTIC

One of the more recent developments incorporating vermiculite has been the manufacture of an acoustical plastic, now available throughout the country.

This material has been employed successfully in many theatres. It has a high sound-absorbing efficiency because of the inherent sound-proofing characteristics of vermiculite itself. (See Table 3.)

Vermiculite is comprised of many tiny laminations, between each of which is entrapped dead air cells which offer high resistance to the passage of heat. Cumulatively, these granules provide one of the most effective barriers to heat dissipation.

When this acoustical plastic is troweled on over existing surfaces, it presents a seamless monolithic surface, ideally adapted to the rendering of decorative murals and designs. When painted, none of the natural sound-absorbing efficiency of the material is hampered. An attractive rough-textured finish is achieved through the use of vermiculite acoustical plastic.

TABLE 3—Sound absorption test. Coefficient of sound absorption recorded for Zonolite acoustical plastic, ½ inch thick, after being painted with two and four coats of water paint. (From "Zonolite Acoustical Plastic," published by the Universal Zonolite Insulation Company.)

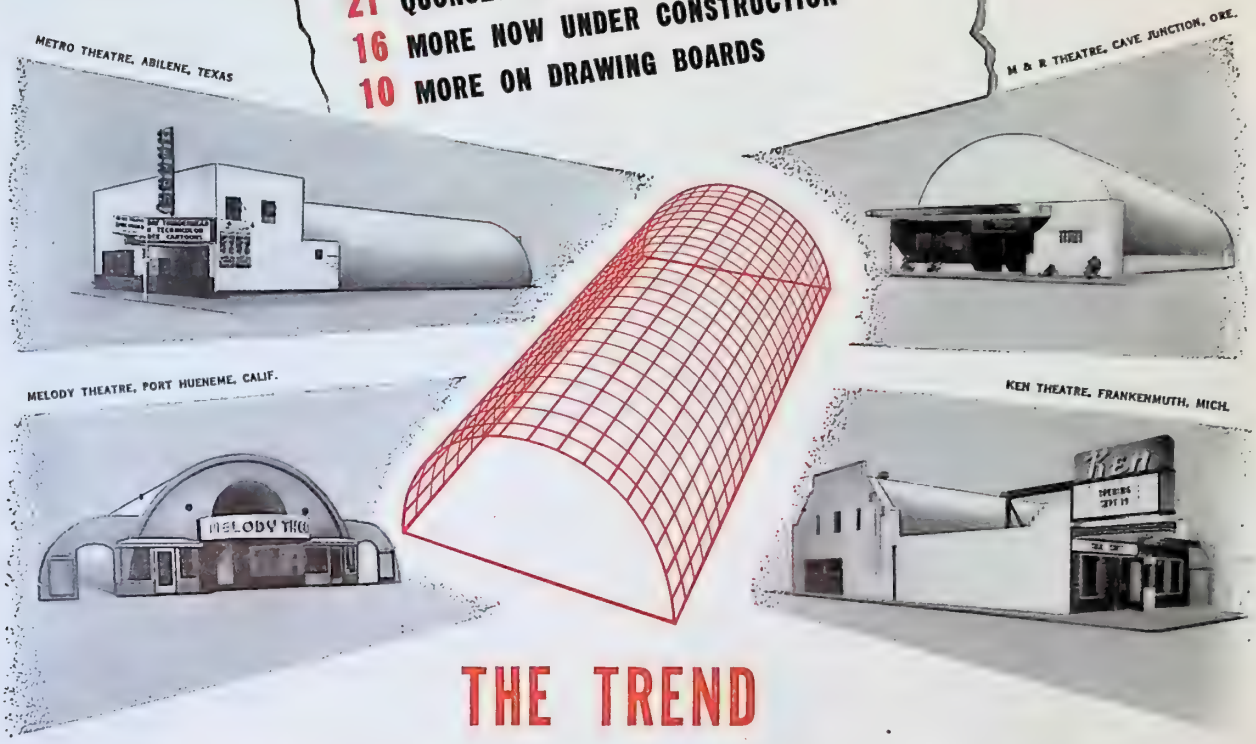
FREQUENCY (cycles per second)	COEFFICIENTS* 2 coats	COEFFICIENTS* 4 coats
128	.31	.30
256	.32	.37
512	.52	.59
1024	.81	.84
2048	.88	.74
4096	.84	.65
Noise Reduction Coefficient	.65	.65

*As determined by a Nationally known laboratory.
Meets Federal Specifications SS-A-111, Acoustic Materials, Type 11, Classes 1 and FF.

SUMMARY

For complete insulation of theatres, combined with sound treatment and fire protection, vermiculite unquestionably provides the owner, architect and contractor with one of the most versatile building materials at his disposal.

21 QUONSET THEATRES NOW IN OPERATION
16 MORE NOW UNDER CONSTRUCTION
10 MORE ON DRAWING BOARDS



THE TREND

is to the Quonset* 40 for small-community theatres

. . . AT LOWEST COST

Theatre owners throughout the country are eagerly turning to the Quonset 40 for adaptations to movie houses that are completely different from anything seen before.

An important motive actuating this trend—besides the incentive of lower cost—is the adaptability of the Quonset 40. It represents a new standard of entertainment luxury that box office receipts indicate is appreciated by the public. Customers are held by the Quonset theatre's optimum acoustics, attractive appearance inside and out, as well as comfortable air conditions the year-round.

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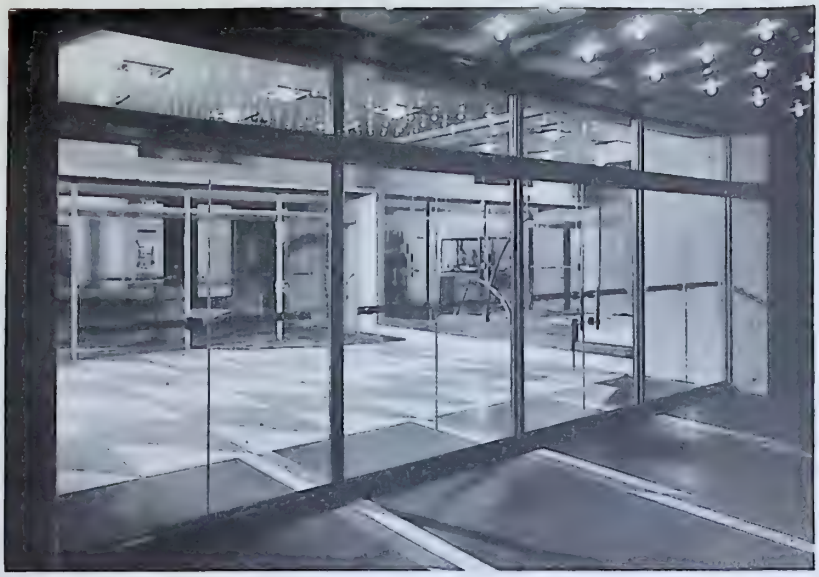
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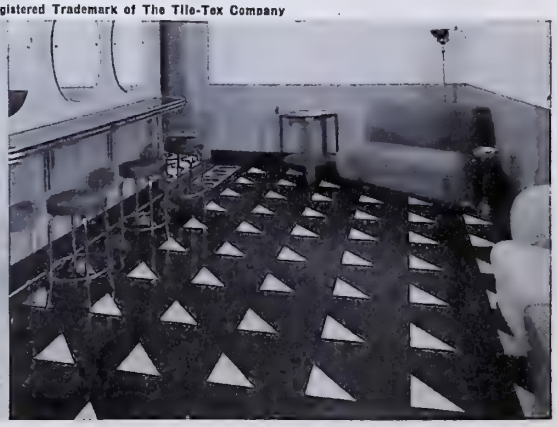
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DRIVE-IN THEATRES

1947-48

Layout and Construction of Auto Theatres

Some Salient Details of Drive-In Theatres To Be Appreciated by Prospective Operators

GEORGE M. PETERSEN
Owners' Representative

That the future of the drive-in theatre is assured is due to the intense appeal of this type of entertainment to a great number of persons who will not patronize an indoor house and, also, to the large investments which are being made in this type of theatre and there is nothing of a temporary nature in the construction of modern drive-in theatres.

The reader may recall that prior to the World War the drive-in theatres were erected, complete with equipment, at costs ranging from $25,000 to $40,000 and many persons at that time predicted that the drive-in theatre would be another miniature golf setup—here today and gone tomorrow. Just how wrong this prediction was can best be judged by the large number of drive-in theatres which have been erected since the war, the cost of those operations, and the hundreds more projects which are in the planning stage. This type of entertainment is far more popular today than it was eight years ago.

The fact that construction costs have jumped better than 50 percent over pre-war prices; that the installed price of equipment is often equal to the cost of the completed theatre of the pre-war years; the cost of sites, either purchase or rental, have, in most instances, nearly doubled; the cost of hard surfacing, tiled rest rooms, attractive and sanitary concession stands, and many other items, has not greatly reduced the net earnings is, of course, due to the increased adult admission prices and to charging admission for children, which was not done in the early days.

The modern drive-in theatres, and I do not include the large number of shot-gun type of operation, are costing from $60,000 to $300,000 and upwards, including equipment, but not including the land. Every operation with which I am familiar is doing a tremendous business and even in a certain location in Ohio, where there are six drive-in theatres in a city of 290,000 population, they would be showing good earnings if one or two of the exhibitors had not become panicky and started to cut prices and bring on cut-throat competition.

This big business definitely indicates that the drive-in theatre has become a permanent part of the motion-picture industry and it is the general opinion of those persons who are closest to this type of entertainment that the more drive-in theatres there are—within reasonable limits, of course—the greater will become the drive-in theatre consciousness of the motion-picture public.

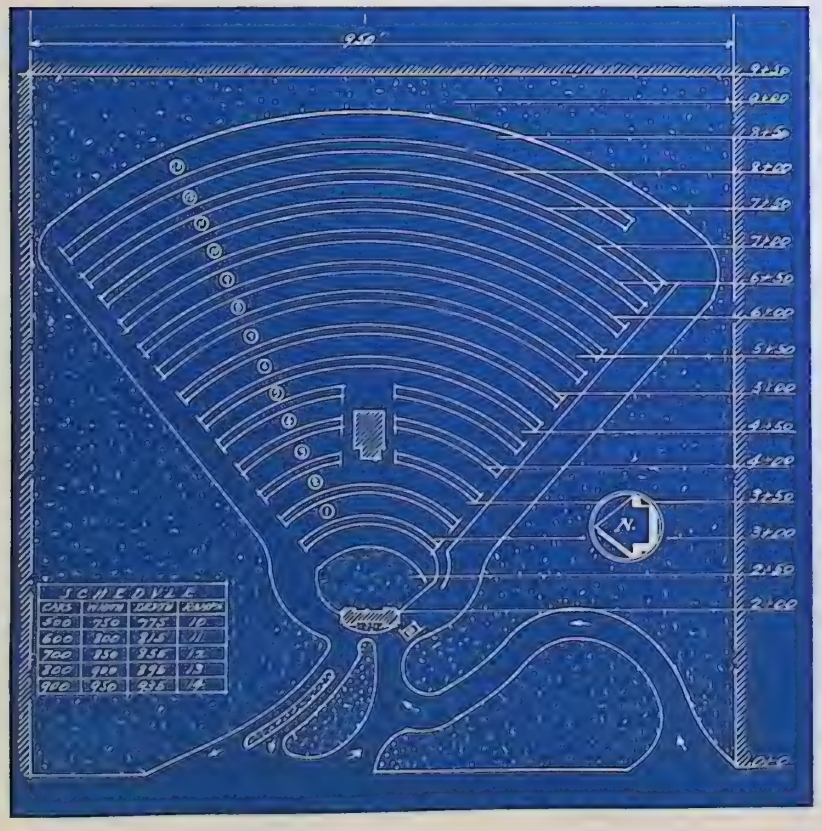
Millions of men and women who were in the Armed Forces and to whom outdoor life appeals, together with many additional millions of factory and office workers who are anxious to take their evening entertainment out of doors in nature's own air-conditioning are the people who desire to enjoy their movies surrounded by good, clean, fresh air which is untainted by the odors of peanuts, garlic, onions, perspiration, and other man-made or created smells. These persons prefer to enjoy their movies in practically the same privacy in which they enjoy reading the evening newspaper in their own homes. These persons are the nucleus of the comparatively new branch of the picture industry which is growing to undreamed of proportions.

When the admission price to drive-in theatres was commonly "35c for Adults, Children Free," a very simple and cheap type of operation was not uncommon. At this time, however, with the admission prices usually at the same level as that charged in the better downtown houses, the entire situation is changed. Today's drive-in theatre patron must be given the best of everything in projection, sound, adequate concession facilities, strictly high-grade rest rooms, and the other conveniences found in the better type of indoor houses if the drive-in theatre is to hold the place in the entertainment field in which it has become an important part.

The owner of the drive-in theatre has a definite advantage over the exhibitor of an indoor operation in many ways, chief among which are the facts that he has no cut seats to repair; no seats to be replaced when a new type of seating appears in the market; no interior decorating to be renewed at frequent intervals; no air-conditioning to be installed and maintained; no heating expense during the winter months; no new type lighting to be installed every few years; and many minor items which are not required by even the finest drive-in theatre operations.

It is the writer's firm opinion that the end of 1949 will see more than one thousand drive-in theatres operating throughout these United States, in spite

FIGURE 1—Layout "A" is the typical, ideal, full-ramp arrangement which is the most desired principally because it brings the most cars closest to the screen. The schedule shows the number of cars desired, the required width, the required depth, and the number of ramps required for a given number of cars. In each instance, the depth includes a setback from the highway of about 200 feet.



of all of the zoning restrictions, highway controls, building ordinances, and other types of legal obstructions which certain elements of the motion-picture industry are invoking to block, hamper, and stop the construction of these popular places of entertainment.

A most interesting point for exhibitors to remember is the established fact that drive-in theatres do not interfere with the gross of the indoors shows which may be operating in their immediate vicinity. Over a period of years the writer has been privileged to talk with many exhibitors who have indoor houses in close proximity to drive-in theatre operations and in not one instance—and this is stated most emphatically—in not one instance has the exhibitor with the bricks-and-mortar job been of the opinion that the drive-in reduced his gross. In a very few isolated cases the indoor exhibitor did state that his net was slightly reduced because of his having to pay more for product in order to keep on a par with the drive-in theatre.

This non-competitive angle is proven by the polls which are taken from time to time in the drive-in theatres in which poll the patron is asked how many indoor shows he sees in a year. Throughout all sections of the country the reply of an average of 70 percent of drive-in theatre patrons was "None."

This percentage may sound a bit excessive until we recall the fact that the drive-in theatre patrons are divided into three general classes: (1) Parents with small children whom they do not desire to expose to the various diseases which are contracted in crowds, 80 percent; (2) cripples, invalids, and convalescents who cannot walk the distances required to attend an indoor show or who would have to be carried in, 15 percent; and (3) transients, and it is only a small portion of these transients who will be considered as prospects for the indoor show, 5 percent.

The potential patrons of the drive-in theatre form an extremely large and practically virgin field of persons who should, and who must be catered to by the drive-in theatres or they will become a total loss to the motion-picture industry. In this connection the writer predicts that within a couple of years, say by the end of 1950, there will be chains of producer-sponsored drive-in theatres throughout the country. They are being constructed at this time and, when the time is ripe, they will burst forth upon the drive-in theatre patrons in all of their glory.

DESIGNING A DRIVE-IN

Contrary to the opinion of a large number of persons who are utterly unfamiliar with the subject of drive-in theatres, there are certain definite elements which must be combined into the completed operation if a successful theatre is to result. These elements must be combined in such a manner that the original construction cost is kept to a minimum without effecting either the appearance of the show, the ease of operating the theatre, or the cost of maintenance, which must be kept within bounds.

There are many "Do's and Don'ts" which have been adopted through a long period of operating and experimenting with fundamentals, as well as innovations to the end that the experienced designer of drive-in theatres will save an owner many times the amount of his fee through the omission, or inclusion, of certain definite items of construction. An example of this fact can be frequently seen in the columns of the trade publications wherein some new drive-in theatre owner publicizes the fact that he has included a dance floor in his plan. So what? The dance floor idea was first used in Ohio about 1941. This was a terrazzo job and was installed on the theory that the early patrons could dance to the music of a non-sync, until the show started. The result was not impressive. The floor was not used for dancing but became a roller-skating rink for the children in the neighborhood during the daylight hours thereby becoming a hazard instead of an asset to the theatre.

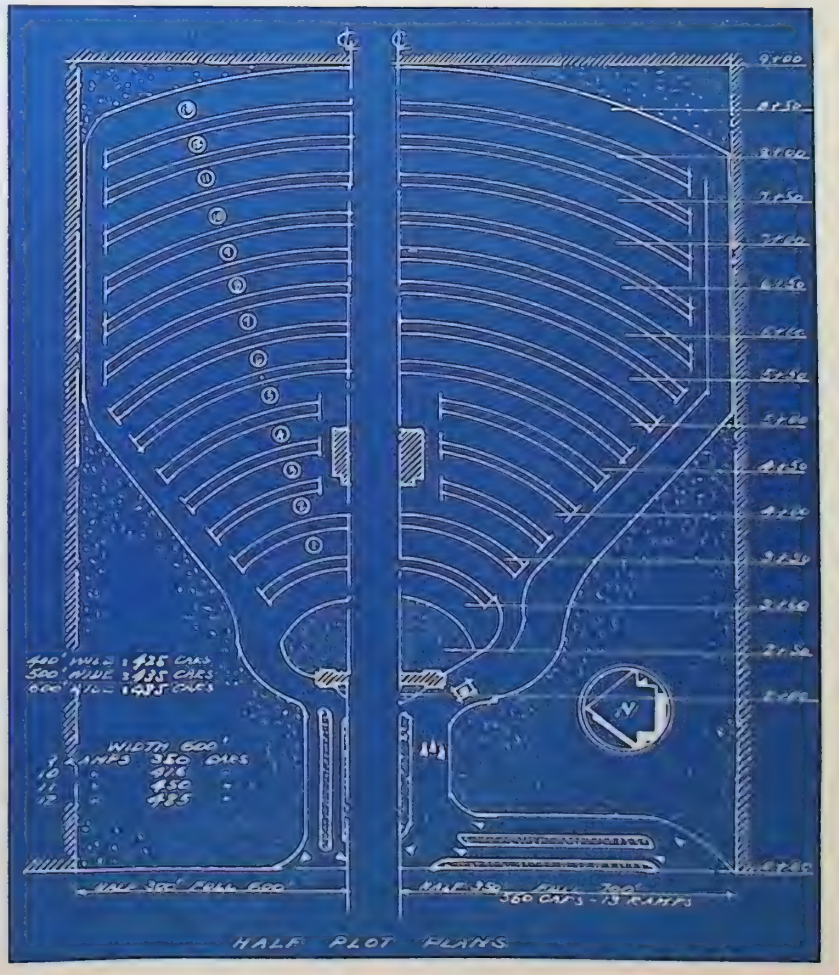
Many drive-in theatres mention in their opening announcements, in the trade papers, that they have included chairs or seats on the first ramp. This type of seating has been included in drive-in theatres for many years and has become almost a "must" for good operations and is no more of an innovation than is the projection equipment in the booth. These two instances are only the start of what an experienced designer of drive-in theatres knows about his job—there are dozens of other ideas, some good, some bad.

BASIC REQUIREMENTS

The drive-in theatre has just three fundamental items to sell: (1) Good sound, (2) good projection, and (3) good vision. Naturally, the first two are mechanical items which may be purchased by the owner and are, therefore, no concern of the designer, but item No. 3 includes good ramps and a suitable screen surface. All other construction is, to a certain extent at least, for publicity purposes or to please the patrons' artistic sense.

Every designer prefers to build an elaborate theatre in preference to one of mediocre type but, when the facts are known, it requires far more experience to design the cheaper job that it does for the expensive one. This is true for the reason that on the more simple jobs every penny spent on construction must produce fundamentals, and every bolt and stick of timbers must be eliminated

FIGURE 2—Layout "B" (shown in half plot plans) is the kind of site which is most generally available for the medium-sized drive-in theatres and, as will be noted, the frontage is narrower than in Layout "A" (Figure 1). Of course, the schedule on a site of this type would require pages of details to show all the various land dimensions and car capacities, but data given offers a working idea.



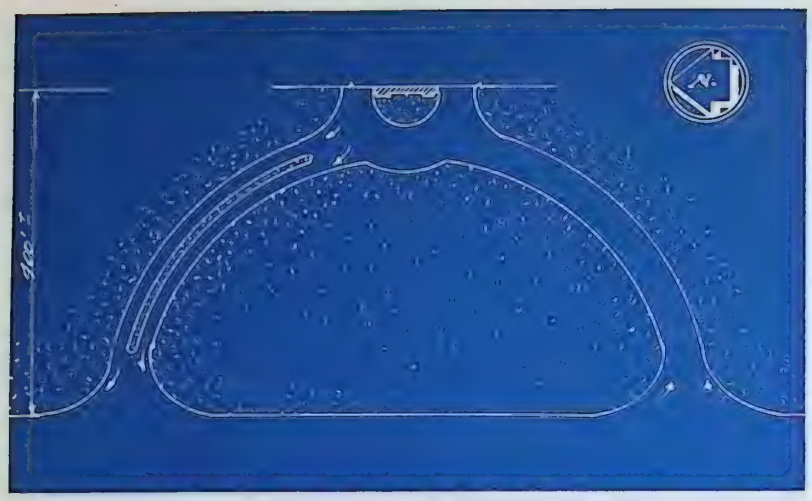


FIGURE 3—Layout "C" gives a suggestion for the approach and exit drives, with an alternate treatment indicated in Figure 4. Although there are dozens of arrangements which can be used, they will conform, in a general way, to one of the three shown on the Layouts A, B, and C. The most important detail regarding the design is sufficient distance between highway and screen building.

that can possibly be omitted.

The writer cannot recall a single instance where a drive-in theatre was constructed without the aid of an experienced designer that did not cost the owner more than the designer's fee for the construction alone and, in many instances, the operating expense and maintenance costs often equal the amount of such fee each year the show is in operation.

SELECTING THE SITE

Naturally, the first step in selecting a site for a drive-in theatre is to check the potential patron strength, and the writer's suggestion to the smaller exhibitor is to stick by the smaller communities of from 30,000 to 75,000 population in which competition will be slow to enter and in which localities the patrons will not demand excessive attention to minor, but costly, details.

The second step is to obtain a site which is sufficiently large for the operation which the owner has in mind. It is surprising to know of the large number of properties which are purchased and which turn out to be about half large enough for the project. Acres, as acres, mean nothing in determining the capacity of a drive-in theatre, as these operations are controlled by both width and depth.

A simple, though rough, method of checking the width of a site is to count the spaces between the utility poles across the front, then pace off the distance between two of the poles. For example, a frontage is five poles wide. The paced distance between two of the poles is about 125 feet. Therefore, you have 5 times 125 feet or a width of 625 feet. If this width is sufficient for your purpose you can then proceed to talk with the owner as to a deal.

In an effort to assist the prospective owner of a drive-in theatre in the selection of a site of sufficient size for his proposed development, the writer has prepared two typical plot layouts which give the size of the land requirements for various car capacities. These layouts are subject to certain variations and many other type and size of sites may be developed into successful drive-in theatre operations, but the typical cases shown will give the owner a general idea as to the area of the land that will be required.

Layout "A" (Figure 1) is the typical, ideal, full-ramp arrangement which is the most desired principally because it brings the most cars closest to the screen. You will note that the schedule on the plan gives the number of cars desired, the required width, the required depth, and the number of ramps required for a given number of cars. In each instance, the depth includes a setback from the highway of about 200 feet.

Layout "B" (Figure 2) is the kind of site which is most generally available for the medium-sized drive-in theatres and, as will be noted, the frontage is narrower than in Layout "A". Of course, a schedule on a site of this type would require pages and pages of detail to show all of the various land dimensions and car capacities, but the data shown will give those who are interested a working idea of what can be done.

Layout "C" (Figure 3) gives an alternate suggestion for the approach and exit drives.

Although there are dozens of arrangements which can be used advantageously, they will conform, in a general way, at lease, to one of the three shown on the Layouts A, B and C. The most important detail regarding the entrance and exit design is to provide sufficient space between the highway and the screen building to the end that cars will not have to park on the public highway while waiting to pass by the ticket office. When the waiting cars start blocking the public highway, there is likely to be friction between the highway patrol and the theatre, which is not conducive to the spirit of cooperation which is necessary on the part of the patrol.

The foregoing remarks can best be illustrated by Figures 11 and 12, the screen building on the former being set back only 50 feet from the highway due to a site which was not deep enough while the latter has a setback of 600 feet. The extra depth shows the building up to advantage in addition to taking all of the waiting cars from the main highway.

ORDINANCES AND CONTROLS

Another reason for the setback from the highway is that certain states, and certainly more will follow suit, have started to control the drive-in theatre operations, chiefly because of the traffic conditions which are developed by them.

One midwestern state has established a minimum width of 104 feet for the entrance drive with the statement that there must be thirteen lanes for traffic to turn off of the highway. The ridiculous angle to this attitude lies in the fact that regardless of how many lanes of traffic leave the highway these same lanes are bottle-necked down to 40 feet in width at a point approximately 40 feet from the highway so that, actually, this arrangement will cause a more serious traffic congestion than would almost any other arrangement. Some politician who is definitely ignorant of traffic conditions at these operations has spoken, however, and that is the last word.

Another state has recently ordered that no drive-in theatre ticket office may be less than 220 feet from the highway. There is some common sense in this decision as the driveway from the highway will care for better than fifty cars and a good cashier should not permit more than that number to accumulate. The normal solution to this

FIGURE 4—An alternate design to that of Figure 3 is shown here. The most important detail is to provide sufficient space between the highway and the screen building to the end that cars will not have to park on the public highway while waiting to pass the ticket office. When waiting cars start blocking highways, there is likely to be friction between the highway patrol and the drive-in theatre.

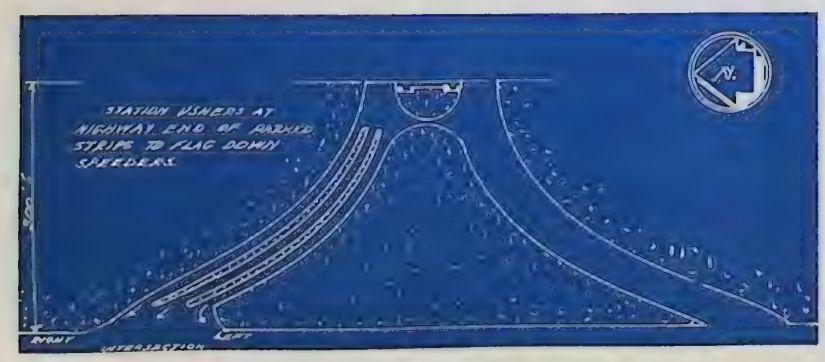




FIGURE 5—The drive-in theatre is a night operation and, while it may be pleasing in appearance during the daylight hours, it must be definitely inspiring at night. In this display, the owner's name is in red neon, while the rest of the words are in yellow incandescent bulbs. While this is one of the more simple types of drive-in theatre signs, it is extremely effective, both in the daylight and nighttime hours, thus fulfilling the prime requisite, architecturally speaking, of the screen-tower building when it is erected at the highway side of the theatre.

problem however lies in the lengthening of the driveway approaching the ticket office and in many instances there is sufficient land in which to weave the road so as to lengthen it between the two points.

The exit drive also presents a problem which requires a solution based upon experience with this kind of traffic. It is not unusual for a drive-in theatre to move from 75 to 100 cars a minute onto the highway so it will be readily appreciated that some congestion is sure to occur unless traffic is slowed down before it makes contact with the main highway and then is properly distributed and directed as it contacts the highway. This may be controlled, to some extent at least, by the exit drive as shown in Figure 4.

REQUIREMENTS OF SITE

There are a few physical requirements which should be checked before the site is definitely decided upon so that an answer may be ready when construction is started. The availability of 220-volt, 3-phase current is most desirable and the presence of 110-volt, single-phase current is almost an essential. In many instances, this electric service may not be directly on the site, but a person can check with the local power company and ascertain if it can be made available and the cost of extending it to a definite location. There are almost as many methods of charging for this extension work as there are power companies, but they generally follow along one of these three: (1) Consumer pays for extension and permits company to deduct a percentage of his bill each month until he has been reimbursed the extension cost; (2) power company pays for extension upon deposit of a substantial amount by the consumer and all bills are applied against the deposit until it is amortized; or (3) power company pays entire cost of extension.

It is customary under any type of extension charge to have the consumer pay for any poles which are set on his property.

Another item to check on is the availability of city water and sanitary sewer. It is far more desirable to provide city water to the site than to drill a well and provide pumping and pressure tank even though the city water should cost more money. Sanitary sewers are also desirable and much to be preferred to septic tanks, dry wells, and filter beds, but it is exceptional when this item is accessible to a drive-in theatre site. Storm sewers are also desirable and are frequently available but, in most instances, they are too small to be of much practical use for drainage purposes.

DRAINAGE OF RAMPED AREA

The proper drainage of the ramped area is of the utmost importance if the theatre is to be operated at a minmum of expense on the surfaced areas. Improper drainage permits such water to stand in puddles and gradually penetrate into the subsoil to the extent that the subsoil becomes saturated and cannot dry out before the surfaces seals the moisture in. This causes spongy spots which will continue to cause trouble until they are dug up and filled with dry material and, if there are very many of these spongy spots, the repair becomes a major expense. If the cost of the drive-in theatre has to be kept to a very minimum it is far better to cheat on anything else but on the ramps, surfacing, and drainage.

SLOPE OF LAND

The question is frequently asked, "Which way should the ground slope?" The reply to this question is that the ideal slope is to have the high point at the rear and the slope toward the highway. Except for the cost of grading, it makes little difference which way the grade runs. The grade may be to the front, to the rear, to either side or to both sides with the high point along the center line of the show. The important point is to have a means of disposing of



FIGURE 6—Where the screen building is located at a considerable distance back from the highway, a V-type attraction board should be set between the highway and the screen building. At times, sign installation may be made on the highway side of the screen building with good effect.



FIGURE 7—Another example of the V-type program board. Although the board shown in Figure 6 cost some three times that of the one shown here, the latter has a most pleasing appearance both day and night. Signs must cause favorable comment from those who view them by day or night.

the surface water after it is drained from the ramps, as we must realize that natural soil has considerable absorption but after seven or eight acres are sealed with surfacing material all of the water which falls on the area must be disposed of in a short period of time.

This excess water may be run into storm sewers, if available and of sufficient capacity; into highway or farm ditches; or into nearby creeks or natural waterways. Where none of these disposal methods are available the job of ridding the area of water becomes a problem for special treatment and an expert should be consulted.

SINGLE VS. DOUBLE RAMPS

Considerable publicity has been given to the double parking ramp on the allegation that a "great saving in the depth of the theatre" can be made through its use. In order to explain the actual "saving in depth" and clarify the minds of the prospective drive-in theatre owners on this subject, I will compare the depth required for the two types of ramps, using a 38-foot spacing, center to center, for the single ramps instead of the 40-foot, which I believe to be the most practical through years of experiment. Thirty-eight foot spacings are used on the double ramp and to make a fair comparison we must use this spacing on the single ramp.

With the single ramp construction we have 14 x 38 feet or a total depth of 532 feet whereas with the double ramp construction we have 12 feet, 16 feet, 12 feet, 38 feet for the first two ramps, 12 feet, 12 feet, 12 feet, 38 feet for the second two ramps, and then 12 feet, 10 feet, 12 feet, 38 feet for the next ten ramps which gives us a total depth of 78 feet plus 74 feet plus 360 feet or a total depth of 512 feet, or a saving in favor of the double ramp of exactly 20 feet.

Against this negligible saving in land, we must realize that with the double ramp construction there are sure to be some cars backing out of their parked positions while other cars are driving forward, and consequently, a congestion of traffic within the parking area is sure to occur to a far greater extent than in a single ramp theatre where cars are always moving forward in an orderly manner.

It is not my intention, or desire, to sell anyone on either type of ramp construction, and I have constructed both types and understand them thoroughly, but it is my desire that persons interested in drive-in theatres understand what they are doing before it is too late.

The double ramp is used in the construction of the cheaper type of drive-in theatres as it permits the use of Bi-Car speakers, located on the first ramp of each pair of ramps, thereby reducing the cost of equipment and installation by about 50 percent. There are comparatively few projects using this double ramp, except under the conditions mentioned, and it was in August, 1947, that an injunction was asked to prevent a drive-in theatre in Ohio from continuing the use of Bi-Car speakers on a double ramp operation and this on a theatre located across the highway from an airport!

SURFACING THE THEATRE

The surfacing of the ramps and drives in a drive-in theatre is of the utmost importance on a first-class operation and with the present construction costs and the high land value it is just not good business to construct a good theatre and then provide the surfacing of a shot-gun operation. Of course we will always have some of this type under construction but it is not for the smart exhibitor.

The old method, and one which is still in use by the uninitiated, was to pile several inches of crushed slag, stone, or gravel on the graded areas and then attempt to roll it into some sort of "surface," leaving inches of loose material for the patrons to plough through. With modern drive-in theatres this primitive method of finishing the ramps



FIGURE 6—Where the screen building is located at a considerable distance back from the highway, a V-type attraction board should be set between the highway and the screen building. At times, sian installation may be made on the highway side of the screen building with good effect.



FIGURE 7—Another example of the V-type program board. Although the board shown in Figure 6 cost some three times that of the one shown here, the latter has a most pleasing appearance both day and night. Signs must cause favorable comment from those who view them by day or night.

the surface water after it is drained from the ramps, as we must realize that natural soil has considerable absorption but after seven or eight acres are sealed with surfacing material all of the water which falls on the area must be disposed of in a short period of time.

This excess water may be run into storm sewers, if available and of sufficient capacity; into highway or farm ditches; or into nearby creeks or natural waterways. Where none of these disposal methods are available the job of ridding the area of water becomes a problem for special treatment and an expert should be consulted.

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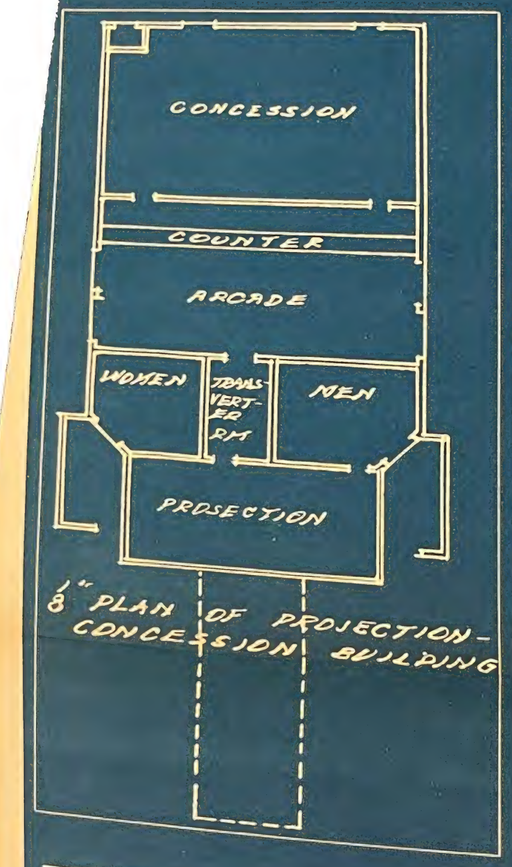
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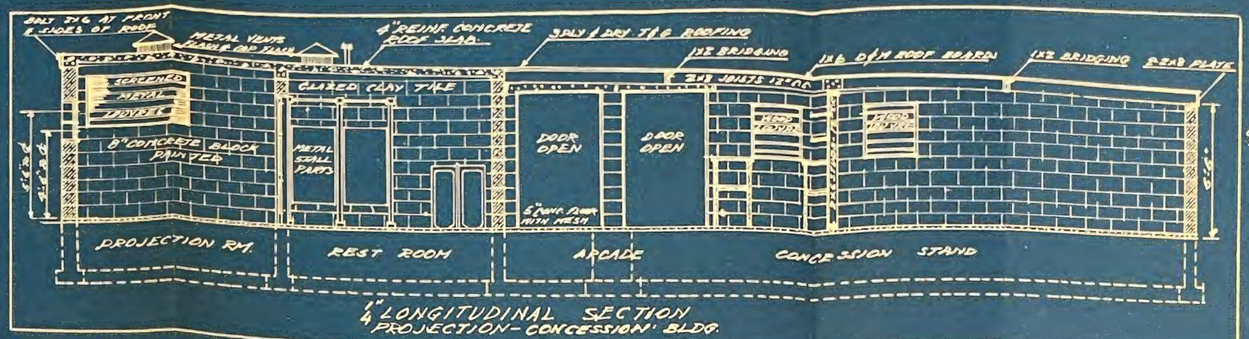
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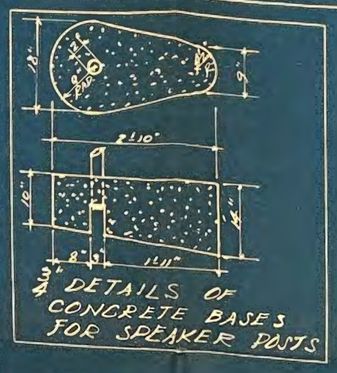
SUGGESTED PLANS FOR AN OUTDOOR AUTO THEATRE



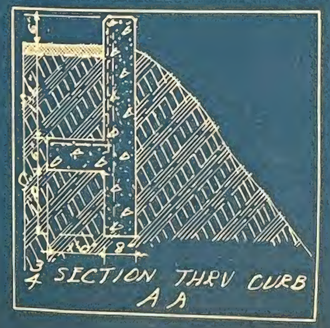
1/8" PLAN OF PROJECTION-CONCESSION BUILDING



1/4" LONGITUDINAL SECTION PROJECTION-CONCESSION BLDG.



3/4" DETAILS OF CONCRETE BASES FOR SPEAKER POSTS

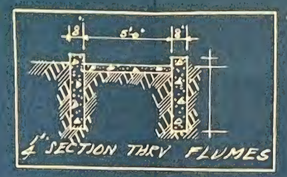


3/4" SECTION THRU CURB A A

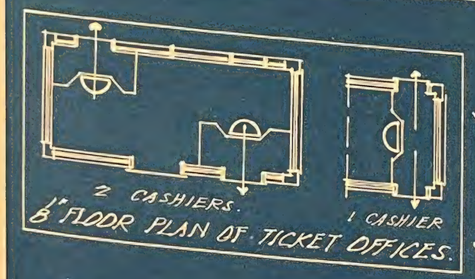


1/2" DETAIL OF CHAIN FENCE
6'X6" POSTS 8'-0" O.C.
1" 10G CHAIN PAINTED

1/4" DETAILS OF FENCE LIGHTING.



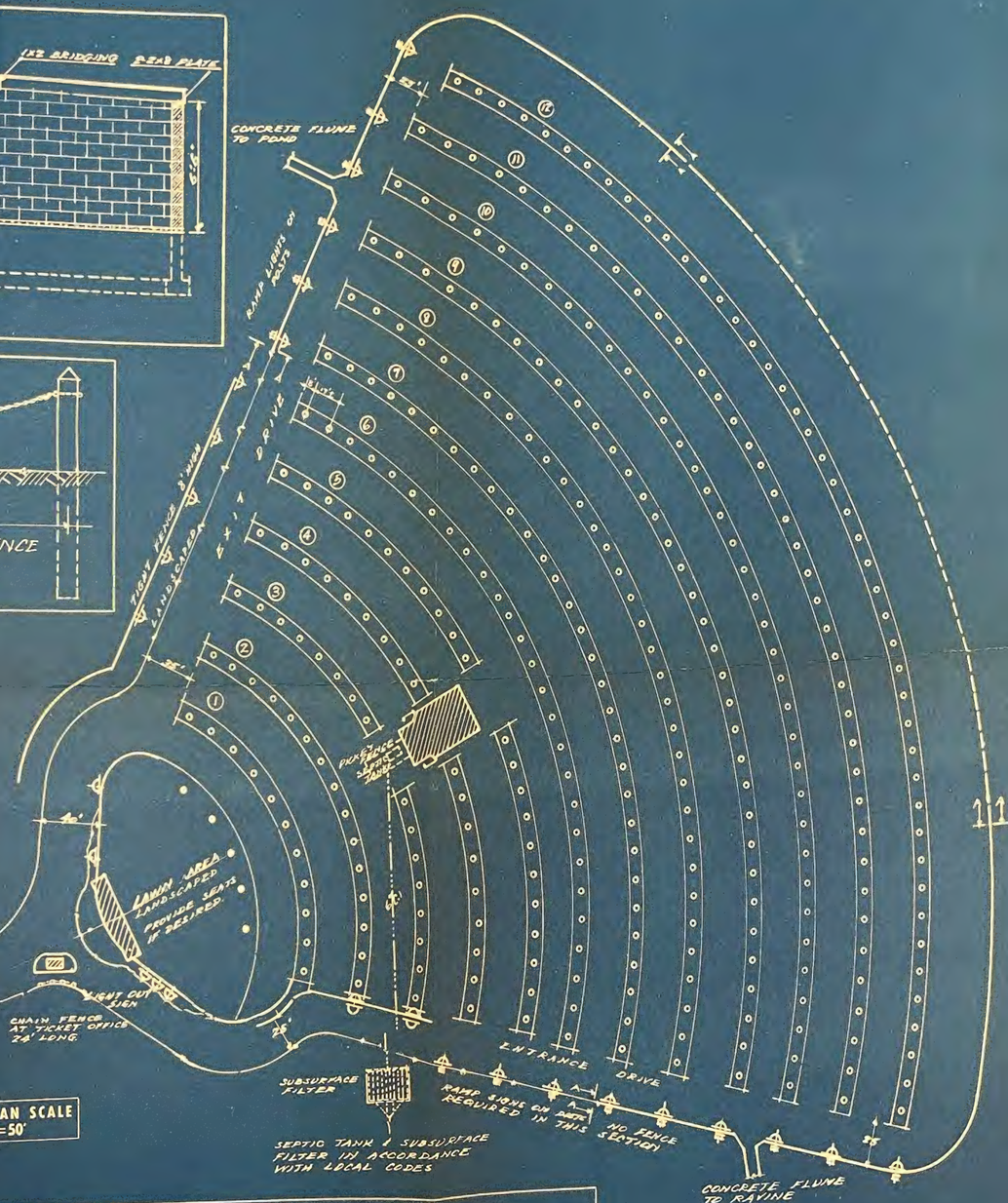
1/4" SECTION THRU FLUMES



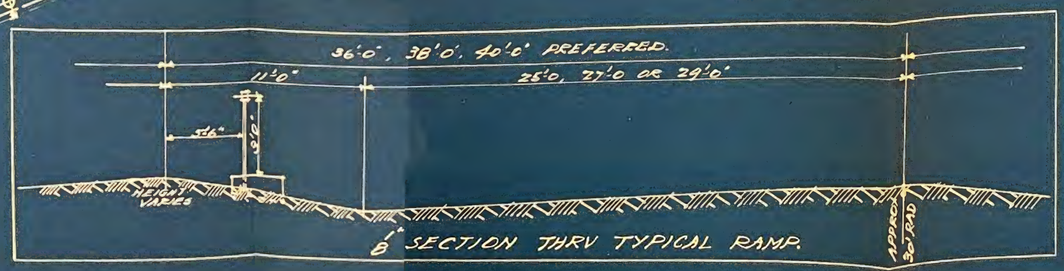
1/8" FLOOR PLAN OF TICKET OFFICES.



1/2" DETAIL OF "LIGHTS OUT" SIGN



PLOT PLAN SCALE 1"=50'



8" SECTION THRU TYPICAL RAMP.

LEGEND.	
○	IN-CAR SPEAKER POSTS.
●	BI-CAR SPEAKER POSTS
	BILLBOARD REFLECTORS
	ROAD LIGHTS & POLES
	GRADE CONN. OUTLETS
	RAMP LIGHTS ON POSTS

11

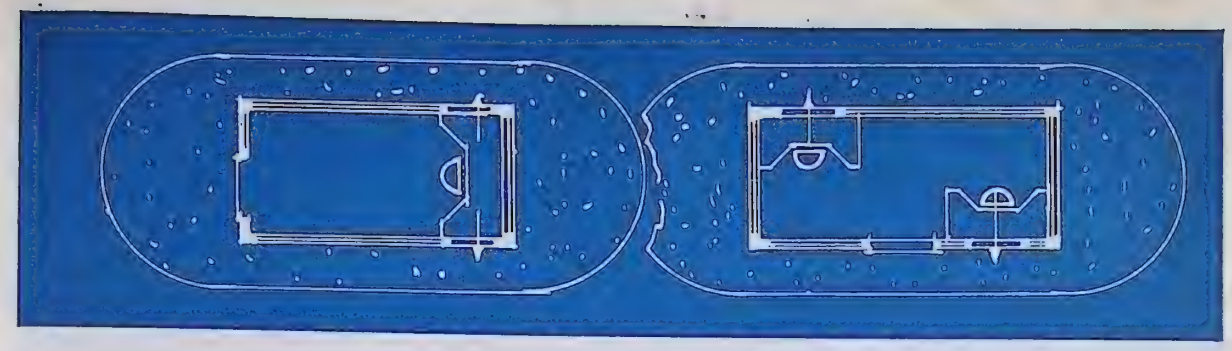


FIGURE 8—Box-office design for a single cashier working both sides of the entrance way. There is a variation of opinion as to the proper type of ticket office that should be used in drive-in theatre operation. The problem is to pass the cars fast enough to prevent highway blocking.

FIGURE 9—Box-office design for two cashiers. In operation, the box office should be open and ready for business when the first car arrives, usually about two hours before the show starts. This prevents a long line of waiting cars building up even before the real rush actually starts.

is no longer used.

People in general, and women in particular with their open toe and heel shoes, object strenuously to cutting their shoes and hose on this loose material Furthermore, this type of surfacing is costly to maintain, as the loose material must be raked up onto the tops of the ramps every day or the ramps will lose their proper pitch due to the low portions becoming raised up by the loose material which is sure to be kicked downhill by the action of the car tires.

The only good that this loose type surfacing accomplishes is to partically prevent the cars from becoming mired in mud in the event of a reavy rain and it usually fails completely to prevent the surface water from penetrating the subgrade with the result that the subgrade becomes saturated with water as previously mentioned. It is true that each type of soil, or subgrade, requires a different type of treatment if it is to be water-proofed in a thorough and economical manner and no general rule can be made in this respect. Some type of seal must be used on the subgrade, however, in the great majority of drive-in theatres if the surfacing is expected to remain firm. The surfacing material must be thoroughly compacted and chocked with fines over which a binder must be applied to hold the surfacing material in position and prevent loose material and dust from annoying the patrons. It makes no difference how beautiful the rest rooms and concession stand may be if the patrons will not visit them because of poor surfacing conditions.

THE SCREEN BUILDING

The screen building is the most costly item on the construction program, not including the grading and surfacing, and may be constructed of wood, steel, or cement blocks. In any case, however, this building should be designed to withstand a wind velocity of 100 miles an hour or approximately 35 pounds to the square foot of surface. Although the great majority of the screen buildings are of wood construction, there are some steel frames but, as a rough guide to the comparative cost of the two materials, the writer believes that the cost of the complete wood frame will be less than the cost of erecting and furring the steel frame without including the cost of material and fabricating which, in itself, will be thousands of dollars. This opinion has been arrived at through keeping a record of the cost of the various items on the two types of jobs. Many persons accept steel as the ultimate of strength and ignore the fact that when a structure is designed for a given load it makes little difference as to the material which is used to comply with the loading conditions.

When speed is the "essence of the contract" and it definitely is on the vast majority of drive-in theatres due to the limited operating season, the wood frame is by far the most popular. There are many other factors in favor of the wood frame, but the cost and speed of erection is the most vital on the majority of operations.

With either steel or wood construction, the entire exterior surface of the framing must be furred with wood to permit the application of the covering material, whether it be asbestos, cement board, aluminum sheets, corrugated glass, enameled metal, or other materials. The fact that the great majority of jobs, both the cheap ones and the costly ones, use an asbestos-cement board for covering is due to many advantages of this type of covering, chief among which are the facts that it is fire-proof, is applied by carpenters, can be nailed directly to the furring without drilling, and does not require paint to protect it from the weather. If, however, the design calls for a painted surface, this material readily lends itself to such treatment and this material is also the cheapest that can be obtained for a good job.

ILLUMINATED SIGNS

Persons familiar with the design of drive-in theatres realize how difficult is the problem of making 60 x 60-foot flat surface into a thing of beauty which will attract and impress itself on the observer. In many instances a smart designer can keep the cost of the structure to an absolute minimum and make the

FIGURE 10—Modern drive-in theatres consolidate the projection room, rest rooms, power-supply room, arcade, and concession stand into one large building which also provides space for a pump room. There are so many features in favor of this type of building that there is little use in considering any other type. Construction may be of concrete block or brick, with a reinforced concrete roof over all.





FIGURE 11—The first step in selecting a site for a drive-in theatre is to check the potential patron strength. It is suggested to the smaller exhibitor to stick to areas of 30,000 to 75,000 population, where competition will be slow in entering and where patrons are not apt to demand costly, but minor details. This drive-in is set back only 50 feet from the highway, due to lack of lot depth in this situation.

job outstanding through the intelligent use of neon and other lighting. The drive-in theatre is a night operation and, while it must be pleasing in appearance during the daylight hours, it must be definitely inspiring at night—something which will cause favorable comment from those who view it to the end that their favorable comment will be responsible for a large amount of free publicity which is beyond price from the exhibitors' angle. A display of this kind is shown in Figure 5, in which the "Sidney Lust" is in red neon and the "Drive-In Theatre" is in scintillating yellow bulbs. While this is one of the more simple types of signs, it is extremely effective, both during the daylight and the dark hours.

The installation of the transparent type of changeable letter attraction board to the front elevation of the building also greatly assists in reducing the apparent height of the structure, and the projecting break at the ground level aids materially in giving the structure a greater depth in addition to increasing the available usable floor space within the structure. In many instances, however, where the screen building is located a considerable distance back from the highway a V-type attraction board should be set between the highway and the screen building. Two such boards are shown in Figures 6 and 7. Although the board of Figure 6 cost three times that of the Figure 7 board, the latter has a most pleasing appearance both day and night.

The floor area of the screen building frequently provides space for the manager's office, electrical distribution room, girls' locker room, and boys' locker room. Several of the newer and larger operations also provide a manager's suite, which will compare favorably with the suites in the better class apartment houses. These suites are not an additional item of expense as in every instance the manager has been willing to have from $25 to $40 per month deducted from his earnings so that, over a period of years, the suite will be paid for in cash saving. Furthermore, the management of a drive-in theatre is practically a twenty-four hour a day job, if the manager has to travel any distance from his home to his work, so he is more than willing to live on the site provided the living quarters are made attractive to him.

TICKET OFFICE

As is usual with most every type of operation, there is a considerable variation of opinion as to the proper type of ticket office that should be used with a drive-in theatre operation. The problem to be solved is to pass the cars by the ticket office at sufficient speed to prevent them blocking the highway, and the solutions are many. But the best one, in the opinion of the writer, is that of having the ticket office open and ready for business when the first car arrives, usually about 2 hours before the show starts, in order to prevent a long line of cars building up in advance of the real rush.

When the ticket office is opened early a really good cashier should be able to keep it moving with about four girl carhops helping in the ticket sales; but, with the average run of cashiers, it is often necessary to have two in the

FIGURE 12—This screen tower building is set back 600 feet from the highway. The extra depth shows the building up to advantage, in addition to taking all of the waiting cars from the main highway. Another reason for such setbacks is that certain states have started to control drive-in theatre operations chiefly because of the traffic conditions which are developed by them. One state, for example, requires an entrance drive 104 feet wide, and thirteen lanes for traffic to turn off the main highway. (Compare Figures 11 and 12 with Figures 1, 2, 3, and 4 on layout.)



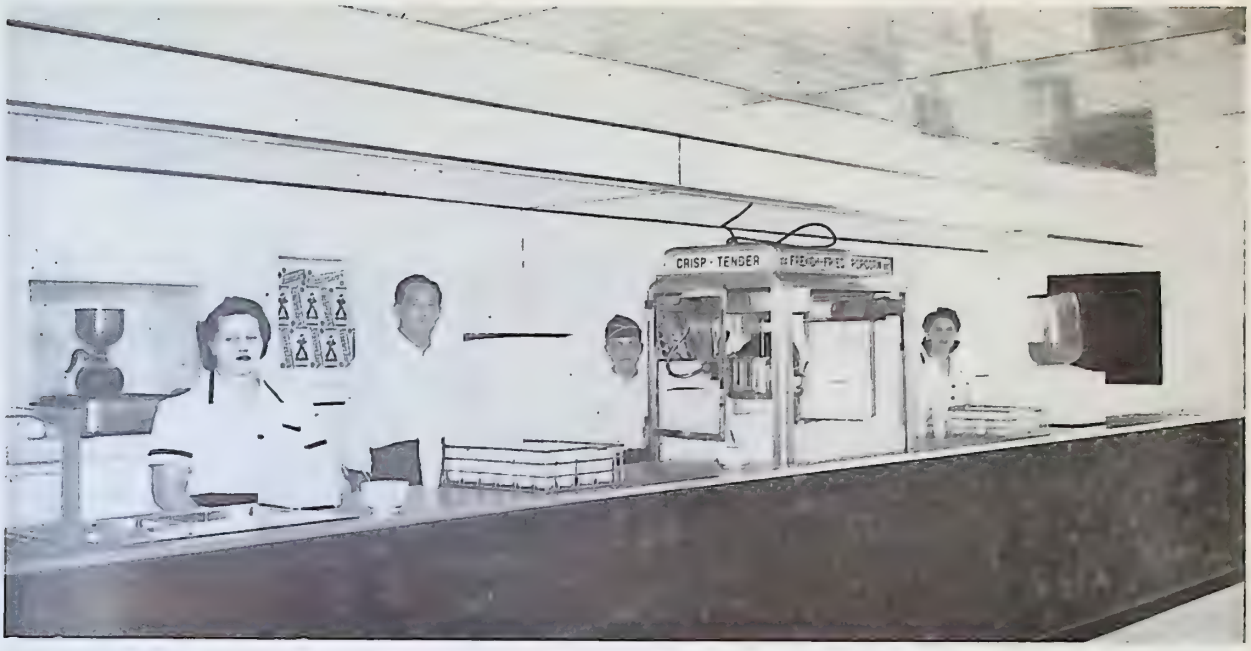


FIGURE 13—The concession stand is an important part of the drive-in theatre setup and should be designed by someone fully familiar with such operations. In addition to the proper display and sale of the various items, provisions must be made to keep traffic moving past the counter with the usual idea of getting their money and making room available for the next customer. The standard sales items for the concession stand consist of popcorn, soft drinks, hot dogs, hamburgers, potato chips, ice cream, tobacco, candy, gum, coffee, and minor items as may be locally popular.

ticket office, one working each side. On some operations, particularly near the larger communities, two ticket offices are used to permit the entrance of four lanes of cars. Many of the operations which use the two ticket offices, however, really need them only on the week-end nights, so they could get along with one without too much trouble. Less unfavorable comment would be made by the patrons, however, if a portable ticket office was run out on these extra busy nights, as they object to having facilities available which are not used but think nothing of waiting in line if there is only the one entrance available. Figures 8 and 9 illustrate the most simple type of ticket office arrangement for one and for two cashiers. These may, of course, be elaborated upon to any extent desired.

PROJECTION-CONCESSION

Many of the modern drive-in theatres consolidate the projection room, rest rooms, Transverter or power-supply room, arcade, and concession stand into one large building which also provides space for a pump room if a well is used for water supply. The construction of this building is usually concrete block, or brick, and has a reinforced concrete or pressed steel roof over the entire building. The exterior view of this type of building is shown in Figure 10. There are so many features in favor of this type of projection-concession building that there is little use in considering any other type.

The layout of the projection room varies with the equipment which is to be installed but a minimum size should be about 24 feet x 11 feet. In addition to the equipment, provisions must be made for the removal of the heat generated by the projectors and toilet facilities for the projectionist. In many states, the code requires two exits from the projection room and, when designing in those states, it is customary to provide one exit at the end of the room nearest to the men's rest room so that the projectionist will be handy to it. In other states, a tin-clad door can be placed to open directly into the men's rest room, while in still other states, a toilet room is required in direct connection to the projection room and it must be provided with a Dutch door, half of which can be left open while the lower half is closed, so that the projectionist may keep an eye on the projectors at all times. Of course, the union rules in

FIGURE 14—The days of the painted concrete block walls, cement floor, wood stall partitions, trough urinals, and one small lavoratory are definitely gone. Quarry tile floor and either tile, glazed brick, or glazed hollow tile are used for floors and walls, and the plumbing equipment is of the latest model and design. Here is a view of an easy-to-maintain men's room in a modern drive-in theatre operation.



many locations provide for the employment of two projectionists so that the regulation men's rest room can be used without violating the code.

The concession stand is an important part of the drive-in theatre setup and should be designed by someone fully familiar with such operations. In addition to the proper display and sale of the various items, provisions must be made to keep the traffic moving past the counter with the usual idea of getting their money and making room available for the next customer.

The standard sales item for the concession stand consist of popcorn; various types of soft drinks; weiner sandwiches, either steamed or broiled; hamburger sandwiches, with relish, onion, and catsup; packaged potato chips; ice cream, usually in paper cups; cigars and cigarettes; candy bars; chewing gum; hot coffee, preferably Silex-made; and a few minor items which are popular in the locality. The most satisfactory method of vending these items, away from the counter, is to provide the patron with one or two printed menus when he purchases his ticket at the entrance. These menus contain a listing of all the items available at the stand together with the cost of each item and, when a patron desires service, he fills out the menu with the items he desires, writes his license number in the proper place and then slips the menu under his windshield wiper from where it is picked up by the vendors who patrol the ramps. This method secures the maximum business for the concession stand and at the same time prevents the vendors from annoying the patrons who do not desire service. In some operations, vendors of popcorn and ice cream, kept frozen with dry ice, walk the ramps and are called by those persons who desire their merchandise. This service is in addition to the menu as previously mentioned. Figure 13 shows the front of a modern concession stand.

REST ROOMS

The days of the painted concrete block walls, cement floor, wood stall partions, trough urinals, and one small lavatory are definitely a thing of the past in the rest rooms of the modern drive-in theatre.

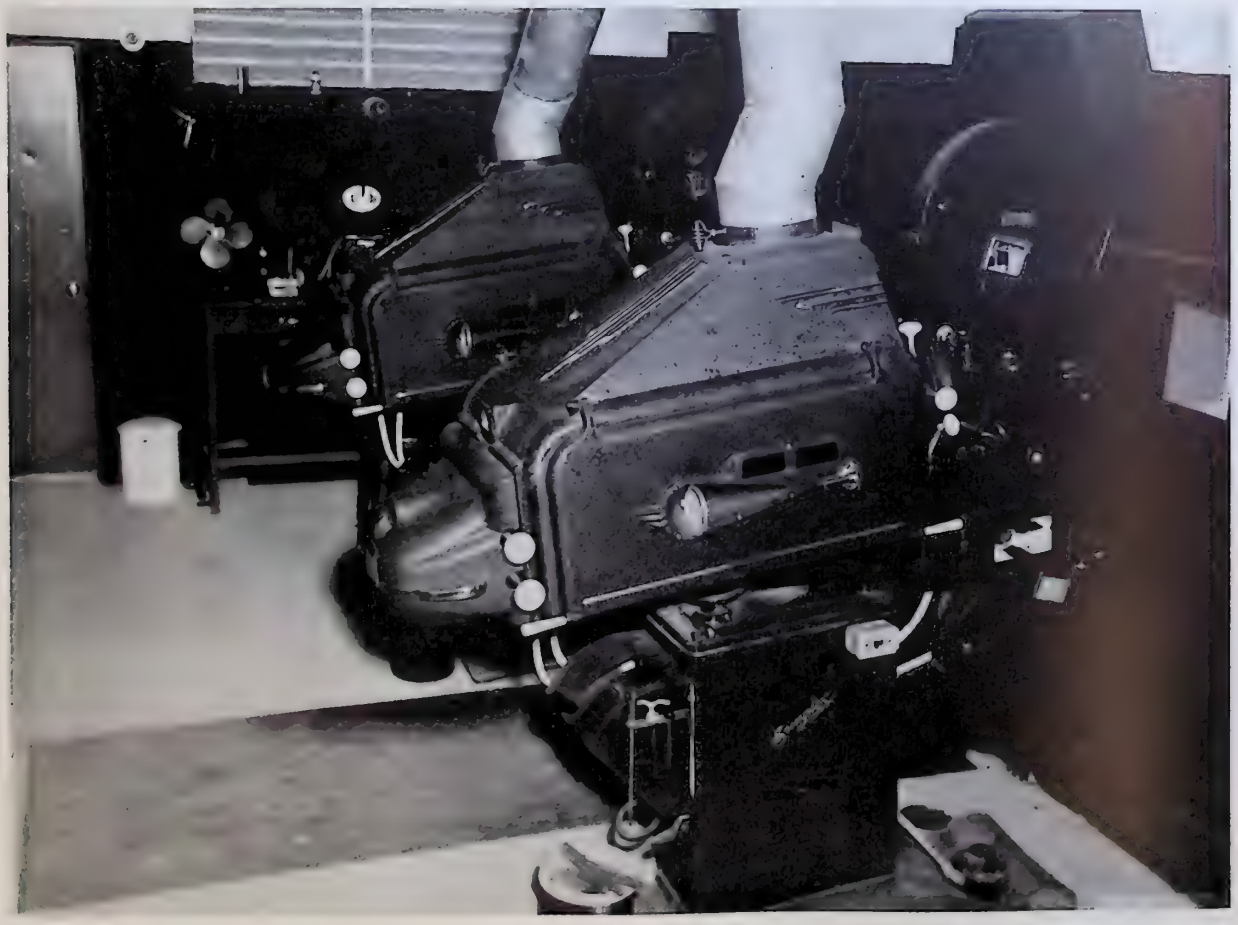
Today we have china urinals, usually three; at least two standard size lavatories in each room; three or four closet combinations in the women's rest room and two or three in the men's. Powder tables are not infrequently placed in the women's rest rooms and quite often matrons are employed to supervise and care for this room.

Quarry tile floor and either tile, glazed brick, or glazed hollow tile are used for the floors and walls, while the toilet stalls are of steel and the lighting fixtures are recessed into the ceilings. Figure 14 shows a partial view of the men's rest room on a modern operation, the steel toilet partitions not being shown.

LANDSCAPING

Second only to the electric signs the most important single item in making a drive-in theatre attractive is the landscaping. With the large areas between the screen building and the highway, and in front of the screen, this cost can run into five figures, unless there is employed a competent landscape architect who will lay out the work in a judicious and economical manner or, preferably, have two landscape contractors submit sketches and proposals which will often permit the contractor to include certain items on which he may be overstocked and on which he will make a good price. Of course, nice lawns are the foundation of any attractive landscaping job and the shrubs and flower gardens are the ornamentation. The average good job should cost in the neighborhood of $3,000, plus or minus, and the addition of colorful

FIGURE 15—Typical modern drive-in theatre booth equipment is shown in this picture, in addition to the various items mentioned in the text. Here are seen Simplex E-7 projection machines, Photophone soundhead, Super Cinephor lenses, Peerless Hy-Candescent lamps, and Simplex bases. Other standard projection-room equipment—as Weaver changeovers, Neumade film cabinets, and Transverters—are also installed. Reflector-type lamps are considered from observation to be the most satisfactory for theatres of twelve ramps or less and for screens up to 45 feet wide.



lawn tables, chairs, and umbrellas will probably cost another $300, but will be well worth expense.

The fenced in area in front of the projection room can be beautified through the use of some grass, a few shrubs, a few flowers, and a small fountain illuminated with a blue light. There are many other ideas which can be worked into this little spot.

FENCES

Few persons appear to understand the fact that the side fences of the drive-in theatre are for the purpose of keeping the road lights from the eyes of the patrons: they are not used chiefly to keep out the non-paying guest. On this basis, therefore, the fence length varies with each site. It is often desirable, however, to construct a heavy wire fence around the outer line of the theatre to prevent children from sneaking in and getting injured by the cars and, also, to prevent animals from committing a nuisance on the ramps.

These enclosing fences can best be constructed of the same asbestos-cement board as used on the screen building. The three principal reasons for this construction lie in the fact that this material does not shrink and leave the wide spaces which occur when wooden boards are used; it requires no paint to keep it looking neat; and the cost of erection is less than wooden boards in the majority of locations. It must be borne in mind however, that the wind resistance of a long, tight fence is considerable and that the fence posts, therefore, must be sufficiently strong and should be set in concrete.

Ornamental picket fences of various designs may be used to advantage around lawn areas, on the radii of the driveways, and similar places but, in the opinion of the writer, should not be used around flower beds where they will obstruct the view. In such places, posts should be erected and connected together by chains which will allow a view of the flowers but will keep off pedestrians and automobiles.

EQUIPMENT

In line with every other type of development in the drive-in theatre field the equipment has proceeded through the various stages of experiment until, today, we have efficient sound and projection. The projection in use on this type of operation consist of the condenser type arc and the reflector type arc and in the former type we have the Peerless Hy-Candescent and the Brenkert Super-High, while in the reflector type there are the Peerless Magnarc, the Brenkert Enarc, the Strong Mogul, and similar equipment. (Figure 15.)

It is not the intention of the writer to enter into any controversary over the effectiveness or desirability of any equipment; but, based solely upon his own observation of a great many drive-in theatre operations over a long period of time, he is of the opinion that the reflector type projectors are the most satisfactory for shows of twelve ramps, or less, and for screens up to 45 feet in width. Also there are many locations where the power supply would be inadequate for the operation of the larger units.

The problem of sound for drive-in theatres has received the most attention from the equipment manufacturers and, during the past eight years, the sound has progressed from the central sound, through the underground speakers, the pole speakers, the wooden Bi-Car speakers, the metal Bi-Car speakers, and now we have the In-Car speakers.

The In-Car speakers which are on the market today are very efficient and give excellent sound reproduction. They appeal to the patron because of the fact that the volume of sound can be controlled to suit the desire of the individual and also because of the fact that the car windows may be closed tight, during inclement weather and the sound still enters the car without undue distortion. (Figure 16.)

The patron appeal of the In-Car speakers was forcibly brought to the attention of the writer recently by an exhibitor who owned two drive-in theatres in the same city, one theatre being equipped with Bi-Car sound and the other with In-Car speakers. This exhibitor made the definite statement that on normal summer evenings the two theatres did practically a dollar-for-dollar business, but on rainy, windy, or other inclement nights the In-Car installation outgrossed the Bi-Car job three to one.

The cost of installation of the In-Car speakers in locations where all work must be performed by union labor is approximately $20 a post (two speakers), which cost includes the trenching, underground cable, concrete bases, pipe posts, and electrical connections. In some localities the work can be done at a lower price but the $20 cost should be used until a firm bid is obtained from a contractor.

FIGURE 16—The problem of sound for drive-in theatres has received the most attention from equipment manufacturers and, during the past eight years, the sound has progressed from central sound, through underground speakers, the pole speakers, the metal and wood Bi-Car speakers, to the in-car speakers as are shown here. Modern speakers are efficient and give excellent sound reproduction.



A Drive-In in the Colonial Motif Designed for Year-'Round Operation

The Dixie Gardens

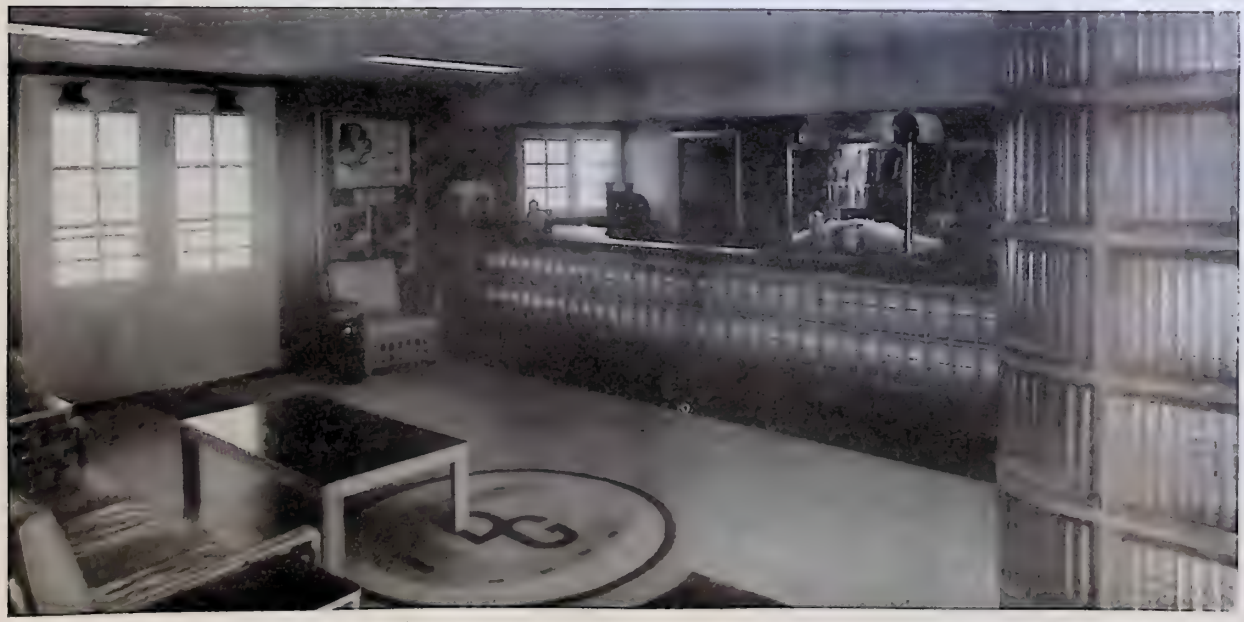




THE DIXIE GARDENS is located on Kentucky's famous Route 42, the gateway to the South, just four miles south of Cincinnati, Ohio, and a fraction of a mile north of Jimmy Brink's popular Lookout House. The entire area has been landscaped to achieve the maximum benefit of the locale.

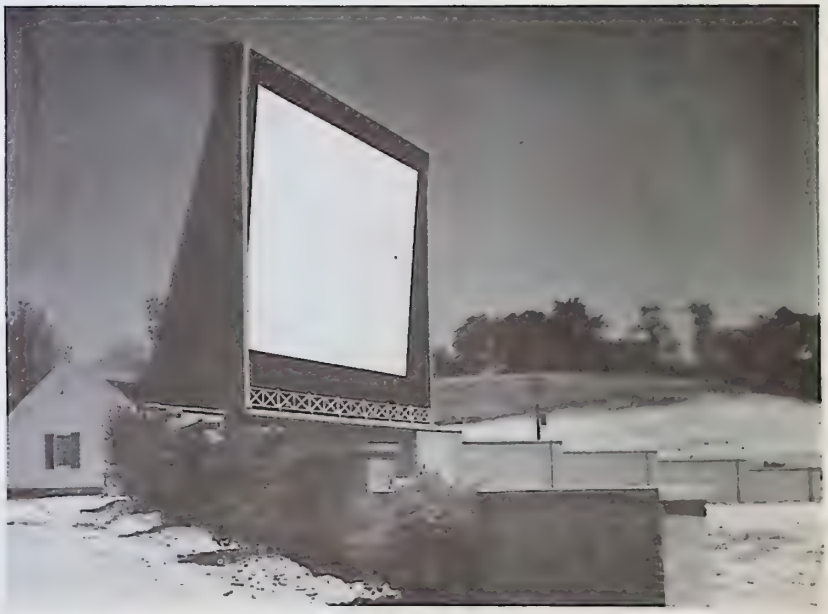


THE DESIGN of the Dixie Gardens, in keeping with the architectural tradition of the Blue Grass Country, is Southern Colonial, features in red brick and white siding. Approaching the spacious widening entrance area, one's attention is immediately arrested by a large attraction board in the center of a shrubbed garden plot, which is topped by a massive horseshoe and sign of sheet metal outlined in gold and green neon tubing. The entire attraction board is mounted on a random rubble fieldstone base containing a goldfish pool. To the right of the main entrance stands the red brick box office which, in accord with Colonial design, has a porte-cochere covering both the entrance and exit drives of the outdoor theatre.





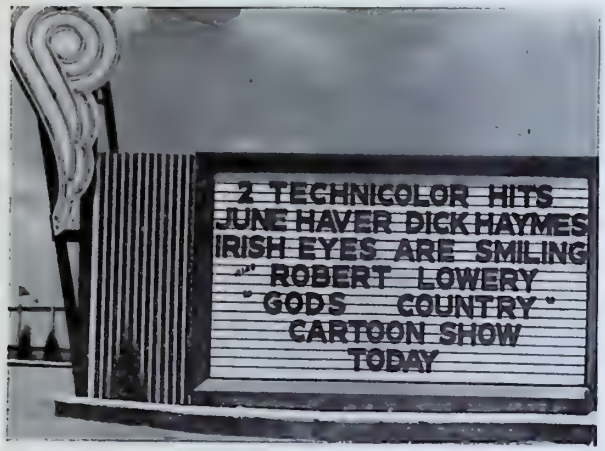
THE MAIN BUILDING of this spacious Kentucky amusement project, designed by the F and Y Building Service, is a large southern Colonial mansion-like structure of white siding with green shutters. Directly behind the main building is located the massive screen tower and parking area for 760 automobiles. Centered in the parking area is a special building of simplified Colonial design housing the projection booth, confection lobby, and rest rooms. The lobby of this building features a long glass-block confection bar, glass-block wing walls which screen the rest-room entrances, and a colorfully rich terrazzo floor, highlighted by a large terrazzo horseshoe surrounding the initials "D. G.," emblematic of the theatre's name. Separating the entrance and exit drives, and immediately in front of the main building, is a large pond which will be converted for outdoor ice-skating. The owners also plan to have picnic facilities and a completely equipped playground within the near future. The entire area of the Dixie Gardens has been skillfully landscaped to achieve the maximum benefit of the natural beauty of the countryside. The attarction boards and letters are by the Wagner Sign Service, with the marquee and sign constructed by the American Sign Company. The projection equipment is Brenkert, by the Brenkert Light Projection Company, with the same company's Enarc lamps. The sound equipment is by RCA. The future of expanded developments such as this is assured due to the intense appeal of this type of entertainment throughout the whole year to a great number of persons who will not, or who cannot, patronize an indoor theatre and, also to the large investments which are being made in this type of cinema. There is nothing of a temporary nature in the construction of these theatres in these days of greater attention to the possibilities that are presented in areas which are chosen with a keen realization of the potentialities of the specific site as here indicated.





Near Philadelphia, Advantage Is Taken of the Contour and Location

The Lincoln Drive-In Theatre





THE LINCOLN DRIVE-IN is located northeast of Philadelphia, on the Lincoln Highway, more familiarly known as the Philadelphia-Trenton road, is operated by Fabian-Hellman Theatres, and was designed by Leon M. Einhorn to accommodate approximately 1,000 cars on the 13 acres of the project.





THE ONE FEATURE setting apart this theatre is the fact that it is located on the west side of the highway, permitting the screen to be erected at the distal end of the plot, with the egress more like a regular theatre. In these pictures are shown the front, with the attraction boards on either side of the main entrance (and a close-up of one of the signs). The box offices are equipped with General Register's Automaticket machines, with coin changers by Johnson Fare Box Company. Capitol Motion Picture Supply was the dealer selected to handle this drive-in.



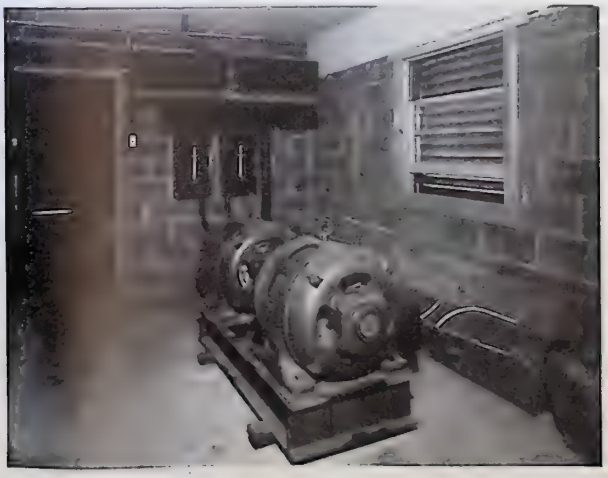




AIRPLANE VIEWS of the theatre—left, looking west; right, looking east — show the fortunate occurence obtaining from a natural slope. Of special note is that no elaborate screen tower is needed to serve as part of the decorative scheme, as well as the fact that good advantage is taken of the natural masking afforded by the trees behind the screen. The screen is constructed of composition board. Concession stands are located in the projection building and also in the structure used, in part, to de-limit the parking area, "auditorium" of the theatre proper.



THE PROJECTION BUILDING is shown on the opposite page. The projection room is equipped with a pair of Brenkert BX80 projectors and high-intensity lamps by the Brenkert Light Projection Company. Kollmorgen's coated Super Snaplite f/1.9 lenses are used. Sound is Photophone, with RCA in-car speakers. Changeovers were made by Essannay for Brenkert. Rewinders are by Golde Manufacturing Company. Direct current is provided by a 49-hp. Century motor-generator, made by Century Electric Company. The booth arouses considerable patron interest.



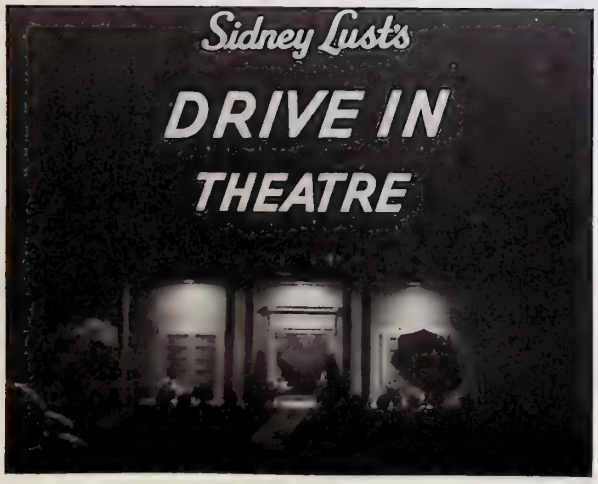


Washington Operator Builds a 1,000-Car Theatre in Beltsville, Md.

Sidney Lust's Drive-In Theatre



SIDNEY LUST'S DRIVE-IN THEATRE is located at an advantageous spot on the Baltimore Pike in Beltsville, Maryland, about five miles from the University of Maryland. Here is one of the new type drive-in theatres, but one which government restrictions prevented the full play of the designer's imagination. Although designed for 700 cars originally, the final theatre as designed by George M. Petersen will accommodate 1,000 cars. The cost of the theatre, excluding land and equipment, was $189,000. National Theatre Supply was the supply dealer for this theatre.







THE THEATRE uses a permanent ticket office for midweek attraction and has a portable ticket office which is run into position for the heavier weekend performances. The ramps are finished in a hard surface to protect the ladies' footwear and make walking to and from the concession a pleasure. The attraction board employs the Wagner Sign Service letters and the borders are in colored neon and blinking colored bulbs. Toilets are finished with glazed tile walls and quarry tile floors, have china fixtures and steel stall partitions. The concession stand is finished in white enameled tileboard, which is typical of the Sportservice installations, and ample storage space is provided for bottled drinks, popcorn, and the like. The designer has arranged the storage space in such a manner that the entire floor area can be scrubbed, or hosed off, daily if necessary without disturbing the stored merchandise. An electric water cooler is provided for the free use of the public. This drive-in has chairs in front of the first ramp. It also has metal tables and chairs, with gaudy beach umbrellas, on the front lawn areas. These items are shown in the night picture. The theatre boasts a screen 32 by 40 feet. Among the latest devices to assure perfect sound and projection are Simplex E-7 projectors, with Peerless Hy-Candescent lamps, Bausch and Lomb Super Cinephor (coated) lenses, RCA sound, and RCA in-car speakers. Direct current is provided by a Hertner Transverter. Other booth equipment includes Weaver changeovers, Neumade film cabinets, Golde rewinders, and collateral items.







Fifteen Acres Used for an Outdoor Auto Theatre in Oklahoma City

The Odom Drive-In Theatre





THE ODOM DRIVE-IN THEATRE operated by R. Lewis Barton and Peerless Theatres, Inc., is located in Oklahoma City, Oklahoma. Exclusive of equipment and land, the cost of the theatre was about $130,000. A 15-acre plot has been utilized for the 948-car theatre. The sign and marquee, as well as the changeable letters are by Wagner Sign Service. The theatre name is outlined with red and green neon letters, with the surmounting directing arrow a blinking red neon. In the box office are Johnson Fare Box coin changers and General Register Automaticket machines. For illumination of the box-office area, three direct 1,500-watt flood lights have been mounted on the tower. Sewerage is provided through the use of a septic tank. A 300-foot well is the source of water. The theatre is located about 3 miles from the city on Norman Hi-Way, United States Route 77.





THE PROJECTION BUILDING houses projection, concession, and rest rooms. In the booth proper are found Simplex E-7 projectors and Four Star sound, with Peerless Hy-Candescent lamps. Other booth equipment includes Strong Zipper changeovers, Neumade film cabinets, Bausch and Lomb Super Cinephor (coated) f/2.0 lenses, Herlner Transverter, Golde automatic and Simplex hand rewinders, and Neumade rewind table. A 1,000-watt Golde stereopticon is also installed. The screen is of white plaster, 62 feet wide by 42 feet high. National Theatre Supply was dealer.



Kentucky Town Gets a More Permanent Type of Outdoor Theatre

The Florence Drive-In Theatre





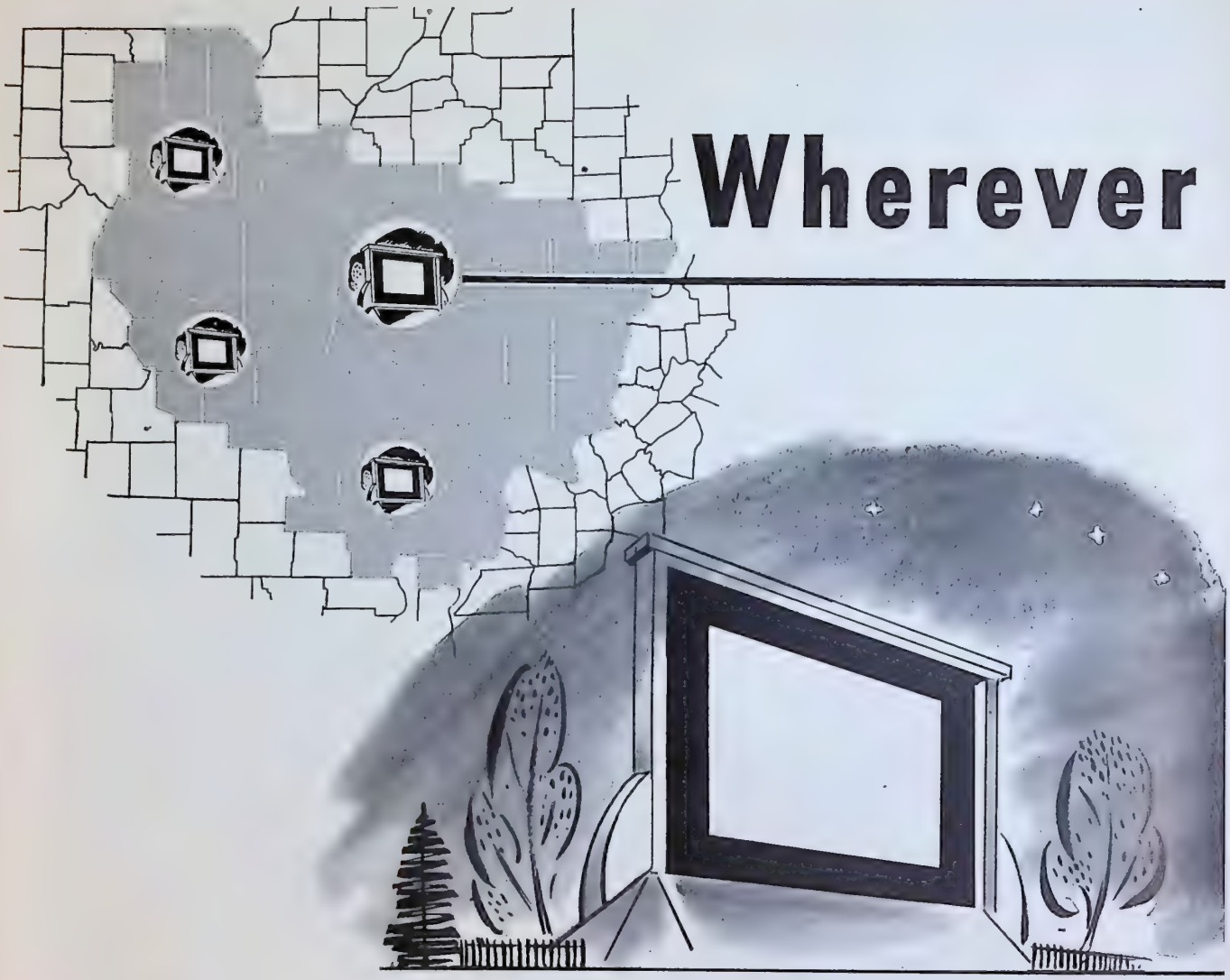
THE DRIVE-IN THEATRE, Florence, Kentucky, has a drive 40 feet wide and more than 600 feet long, so that no cars park on the highway. The 700-car theatre cost, excluding equipment and land, $143,000, constructed for the Richard P. Ernst Realty Company. George M. Peterson designed it.



THE THEATRE is equipped with RCA in-car speakers, Brenkert BX80 projectors, Enarc lamps, and changeovers, Bausch and Lomb Super Cinephor (coated) lenses, Neumade film cabinets, Goldberg rewinders, and Century motor-generator. The attraction board uses Wagner transparent letters. Supply dealer was the Mid-West Theatre Supply Company. Rest rooms have glazed tile walls and quarry tile floors, china toilet fixtures, enameled steel stall partitions. The concession stand is finished with white enameled tile board. A playground is provided.







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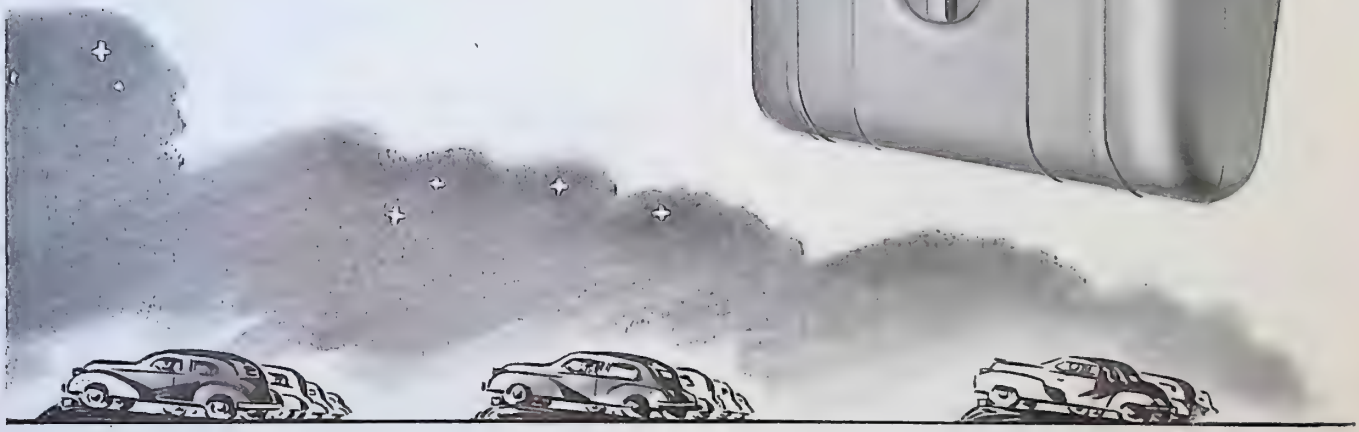
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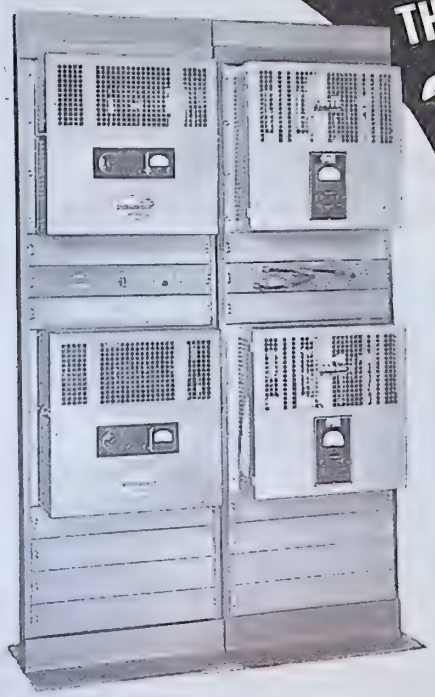
This GUARANTEE covers all phases of mechanical and electrical construction as to parts, labor, etc.

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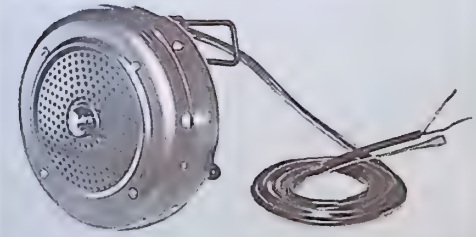
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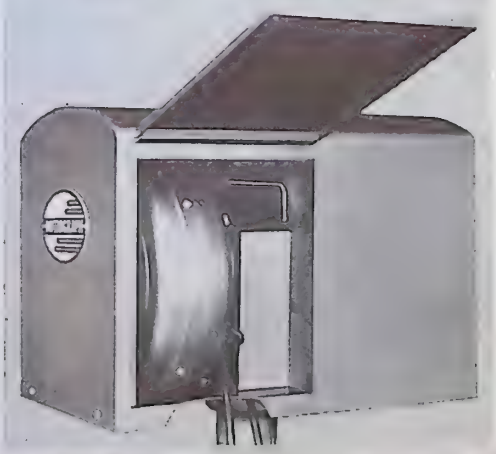


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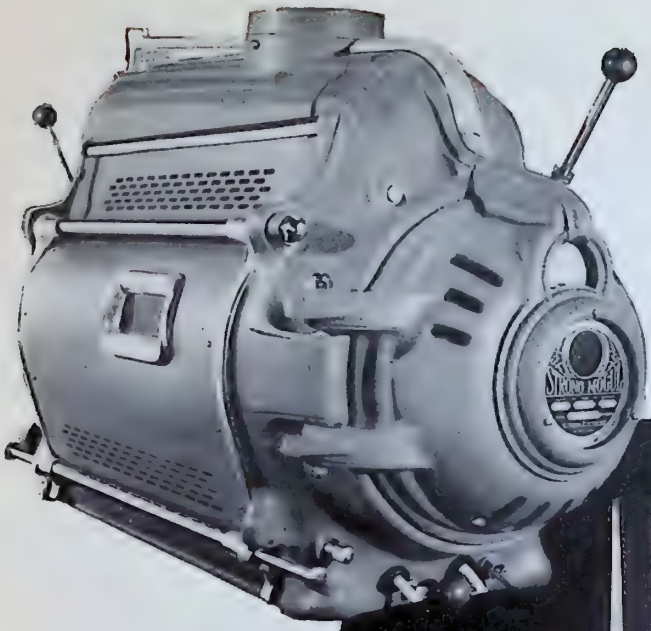
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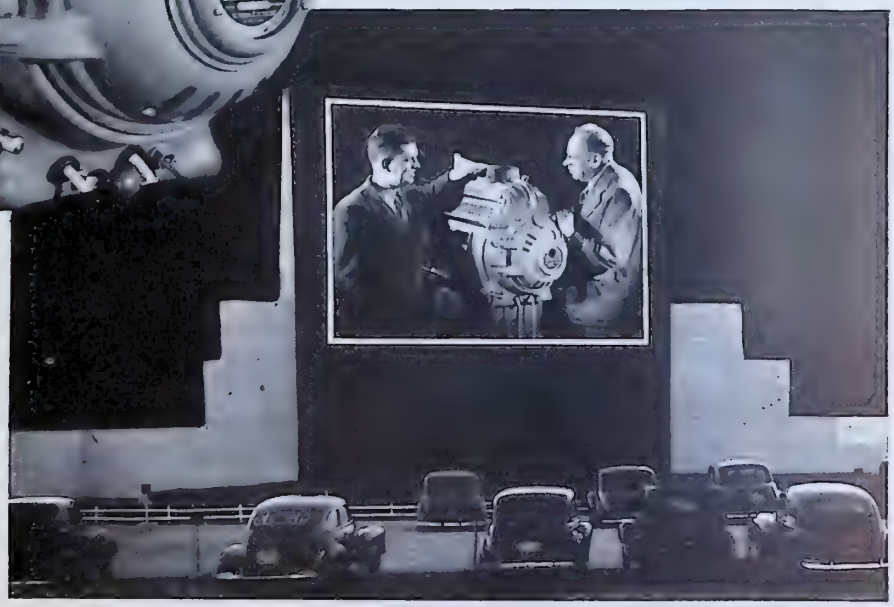
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1909537

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TO ALL TO WHOM THESE PRESENTS SHALL COME:

Whereas RICHARD M. HOLLINGSHEAD, JR.,

of

Riverton, New Jersey,

DRIVE-IN THEATRE,

Whereas

Richard M. Hollingshead, Jr., his heirs

SEVENTEEN

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington this sixteenth day of May, in the year of our Lord one thousand nine hundred and thirty-three, and of the Independence of the United States of America the one hundred and fifty-seventh.

Attest:

Law Examiner.

Acting

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FRONT *and* LOBBY

1947-48

Remodeling the Hillstreet Front and Lobby

Picture Presentation of the Modernization Of an Old, Architecturally Dated Theatre

The primary aims in remodeling the front and lobby of the RKO Hillstreet Theatre in Los Angeles were two: (1) to eliminate the gothic architecture in the lobby and (2) to open the lobby to the street, so as actually to bring the theatre entrance into the street.

The first part was accomplished by designing a dome containing a spiral indirect-lighting cove starting from the center of the dome to the outer rim and continuing at the center down a structural column. The design looks very simple but required extensive study to make it work.

The second part was accomplished by demolishing the two side box offices and stripping the column at the entrance down to a minimum, with the result that there is now 60 feet with clear opening from street to lobby against 45 feet before modernization.

The box office is anchored to the center column and its location is ideal from the standpoint of design and efficient operation.

The wall surfaces are polished terrazzo with display frames and mirrors so arranged to get maximum efficiency for displays in keeping with good taste.

The ceiling is kept at the same level as the marquee to carry out the idea of bringing the lobby into the street.

The lighting of the lobby is accomplished with floodlights recessed into the ceiling showing just sufficient source of light to show an interesting pattern of this lighting.

The floor is non-slip terrazzo designed in a pattern indicating traffic lanes from sidewalk to entrance doors.

The design is up-to-date and exclusive. Materials used require a minimum of maintenance and housekeeping and will retain their original finish for a long time to come.

Here are a few of the special features not usually encountered in modernization of lobbies:

The box office shelves and deal plates are in terrazzo. It contains a built-in drop safe. There is ample space for two cashiers and for the manager checking cashiers in and out without interfering with the sale of tickets. All this is accomplished without suffering from bulky appearance of the box office. The large glass area affords maximum visibility. The floating top plate over the box office is of a graceful 2-inch thickness and the rest of the plate is disguised with flexiglass. Auxiliary floor lights are located in the overhanging plate. All the modern features are incorporated in this box office such as toe space, slanting wainscot and clean-cut appearance.

Entrance pilasters are streamlined, each containing two standard display frames in simple but effective stainless steel frames. All display frames are illuminated indirectly.

Large wall frames are exceptionally deep to permit three dimensional displays. All trim was dispensed with leaving terrazzo returns into the display. This arrangement focuses attention to the display proper. On the opposite side of the large wall frame (20 feet long by 6 feet high) is a wall mirror showing the reflection of the large frame. The large frames are equipped with sectional sliding plate-glass doors.

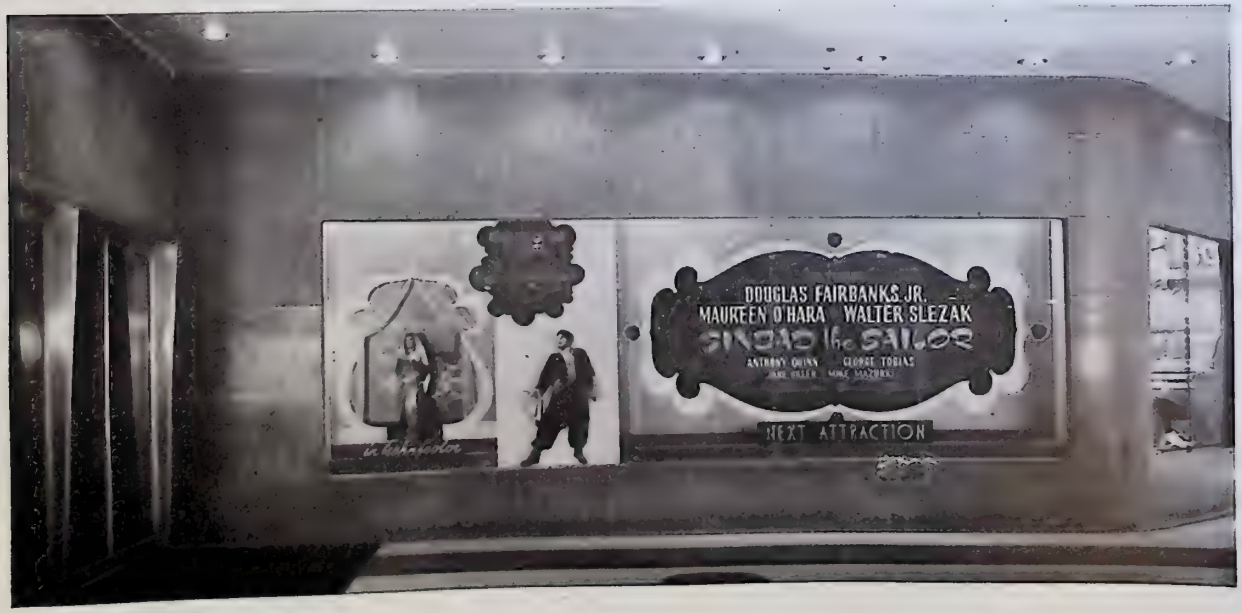
Entrance doors are simulating a glass screen giving maximum vision to the inner lobby. The doors are heavy polished plate glass set in narrow nonferrous frames. This type of door screen is known as the Wanhein screen.

The inner lobby was recently streamlined and contains some interesting features. The new ceiling contains a series of coves and domes, cleverly designed to meet all rquireements and unusual conditions. One side wall contains a candy bar reminiscent of a candy box with bold modern baroque outlines, Plexiglas and a catchy display of merchandise. The popcorn machine is built in inconspicuously as part of the design. The opposite wall is all mirrors reflecting the candy bar. Built into the mirror wall are all glass jewel cases for three dimensional displays.

The dated wrought iron railing was replaced with a cast aluminum rail of modern design.

The finished work is the result of the combined efforts of the Operating and Construction Departments of RKO Theatres and the Heinsbergen Decorating Company of Los Angeles.

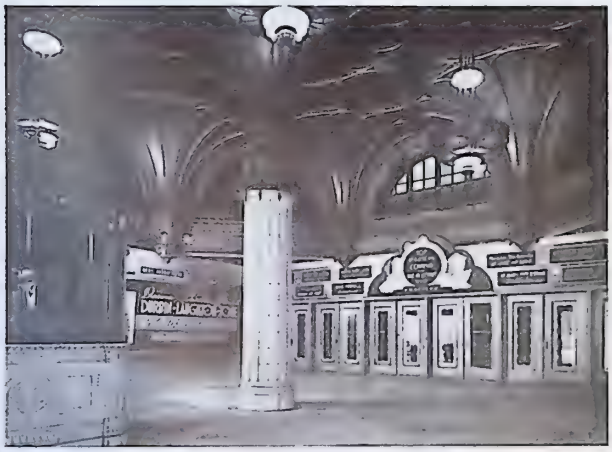
THE LARGE WALL FRAMES are exceptionally deep to permit three-dimensional displays. All trim was eliminated, leaving the terrazzo returns to lead into the display proper. This arrangement focuses attention on the display itself. On the opposite side of the wall frame is a large wall mirror, reflecting the display. The large frames are equipped with sliding plate-glass doors. The streamlined entrance pilasters each have two standard display frames of stainless steel. All display frames are illuminated indirectly. Lighting of the lobby is accomplished with recessed floodlights.







TO OPEN THE LOBBY TO THE STREET two side box offices were torn out and the central column stripped down to the minimum, with the result that there is now 60 feet of clear opening (left) from the street to the lobby as against the former (above) 45 feet. Box office is around the center column.





TO ELIMINATE THE GOTHIC ARCHITECTURE of the lobby (above and below), a dome containing a spiral indirect-lighting cove, starting from the center of the dome to the outer rim and continuing at the center down a structural column, was designed (right and bottom right). The box office is anchored to the central column. This location is ideal from the standpoint of design and operation. The box office is ample for two cashiers and for the manager checking cashiers in and out without interfering with the sale of tickets. The entrance doors simulate a glass screen—known as the Wanhein screen—giving maximum vision into the inner lobby. The doors are of highly polished glass and hung in narrow non-ferrous frames. The floor is of non-slip terrazzo in a pattern indicating traffic lanes from the sidewalk to the entrance doors. The lighting of the lobby is accomplished with floodlights recessed into the ceiling.





Asphalt Tile for Theatre Floor Coverings

The Modernization Programs Should Include Laying Lobby, Mezzanine, Rest-Room Floors

The type of flooring or floor-covering material used in public gathering places —such as theatres, public halls, churches, and the like—should receive every bit as much attention as seating, decoration, or any other one part of the physical set-up.

Properties required in a flooring material include long life, low upkeep cost, safety underfoot, good appearance with a definite decorative value, fire resistance and moisture resistance.

Most interior-decoration experts use the axiom, "Start with the floor." They have learned through years of experience that, no matter how much paint and other decorative ideas are used, any interior leaves a sense of shabbiness unless the floors are also given intelligent treatment, and this applies to theatres or homes with equal force.

TILE FOR LOBBIES

It used to be that carpeting was regarded as a must-have for theatres. But many theatre owners believe that the day of the lobby and mezzanine carpet is past. They have found that the cost of cleaning and upkeep is all out of proportion. The carpet industry itself states that dirt is a carpet's worst enemy and that it must be taken up periodically and thoroughly cleaned by a professional. "Under no consideration should an attempt be made to shampoo a rug or carpet while on the floor," the carpet industry says. "There is no shampoo method or device, which, while the carpet is on the floor, adequately cleans the fabric to the base of the pile or effectively removes the soap and detergent material."

Other objections to carpeting is that the possibility of damage suits is ever-present because carpets become torn and constitute a hazard for falls. Likewise there is a fire danger unless the fabric is given periodic fire-proofing treatment.

The trend away from carpet began during the war when carpet was difficult to obtain. Worn and delapidated fabric floor-covering began to be replaced by various types of tile flooring in lobbies, mezzanines and rest rooms.

THE MEZZANINE of the RKO Kenmore Theatre, Brooklyn, New York, shows flooring of marbelized asphalt tile, with border and inset patterns. During the war, when carpet wore out and could not be replaced, asphalt tile was installed. As time passed, managers found that floor maintenance, cleaning, and replacement problems were not as acute as they had been. When carpeting again became available, and it was proposed to replace the tile with carpet, most managers requested that the tile remain. Geometric designs, as well as special inset ones, can be made with asphalt tile.



Typical is the experience of some fifty RKO theatres scattered across the country. As carpet wore out and could not be replaced, asphalt tile was installed in these houses, often over the protests of house managers. But, as time passed, managers, found that their floor maintenance, cleaning, and replacement problems were not as acute as they had been. When carpets became available again, and it was proposed to replace the tile with carpet, most of the managers asked that the tile remain.

"Rough floor surfaces are difficult to maintain and keep clean and thus are not desirable for general indoor use," says the National Bureau of Standards. "Hence, smooth-surfaced materials are extensively used as floor coverings."

Such flooring includes asphalt tile, rubber tile, cork tile, and linoleum. These are smooth-surfaced and resilient. Ceramic tile, terrazzo, and hardwood are smooth-surfaced but not as resilient as the others.

The various types of tile flooring are most popular, because they are easy to lay, replacement due to damage through severe accident or unusual abuse is not expensive, and individualized effects in colors and designs are more readily achieved with them than with other types.

ASPHALT TILE

Because it embodies virtually all of the desirable qualities required from a flooring material, asphalt tile is looked upon by architects as the solution to the bulk of floor problems.

Asphalt tile was first manufactured around 1920, in dark colors only, and therefore was somewhat limited in its usage at first. Since then, however, many developments have taken place in the product, and with the addition of lighter colors, it has found countless new applications.

Colors

The material is made with asbestos, mineral coloring pigments and asphalt or asphaltic resins as its principal ingredients and hence is highly fire-resistant, moisture resistant and resilient.

It is manufactured in several standardized sizes in both ⅛ and 3/16-inch thicknesses. The most popular size of field tile is 9x9 inches. There is a wide choice of colors, both plain and marbleized, manufactured as follows:

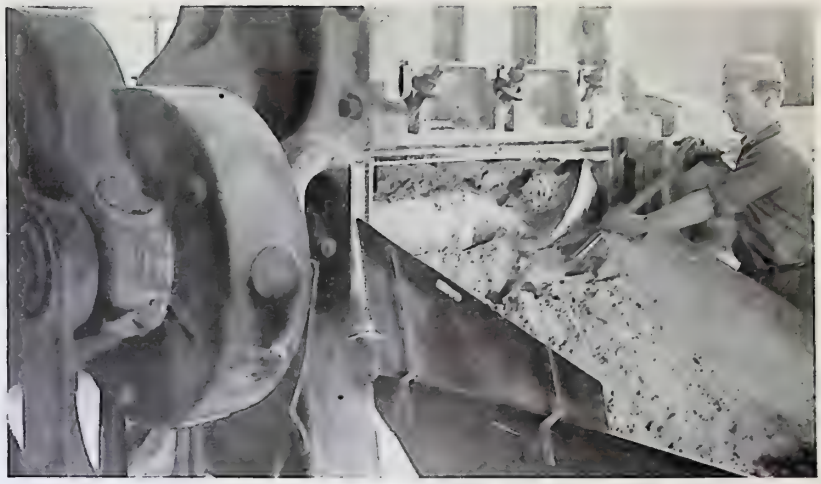
Group A, plain colors only: Black and dark red.

Group B, marbleized colors only: Background colors of black, dark brown, and dark red, mottled with any one or more of the following: White, red, yellow, and green.

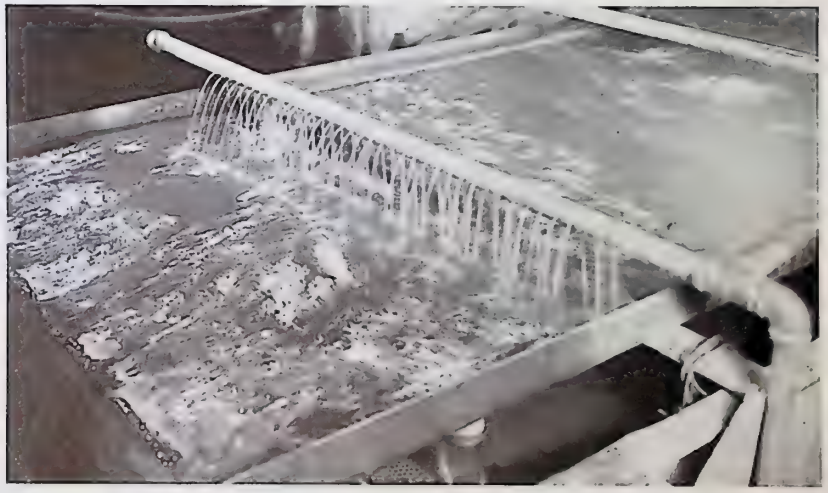
Group C, plain colors: Dark green, light green, light gray, light red, medium red, tan, and buff; marbelized colors: seven background colors corresponding to these plain colors and mottled with any one or more colors to make seven color patterns.

Group D, plain colors: Cream, white, and blue; marbelized colors: three background colors corresponding to these plain colors and mottled with any one or more colors to make three color patterns.

From the foregoing it can be seen that virtually any desired decorative idea can be developed in squares, rectangles,



THE FIRST STEP in the making of marbleized patterns of asphalt tile is the preparation of the mottle colors. Color pigments and binders for the mottle colors are blended in a steam-heated mixer which is being emptied in the top picture. Mottle colors are manufactured separately and are added to the background color to produce marbleized effect. Pleasing patterns are made by combining various tiles.



AFTER THE ASPHALT BLANKET has passed through the finishing calenders (center), it is cooled by a jet of water. It has now been rolled to proper thickness (here ⅛-inch gauge). The final calendering also gives the tile its smooth surface. While still hot, the tile is given a coat of wax. In the bottom picture, the tile is passing an inspector who looks for imperfections in color of the surface and body.





THIRTY MINUTES after the raw materials go into the primary mixers (see three previous photographs), asphalt tile is packaged (top) and ready for installation. Here the tile is being stacked and boxed after passing the inspection tables. Installation is easy with the 9x9-inch tiles, which may be arranged in any pattern with any combination of colors, and even specially cut inset designs can be used.



TO KEEP THE PRECISION of the pattern, borders are generally laid last. In the center picture, the workman is scoring a piece of tile for the border after the exact measurements have been taken. The tile will later be cut. The bottom picture shows a border tile to be set partly under a radiator. Note the provision for the pipe. That heavy articles do not rest directly on the tile, a nut is usually used.



stripes and other designs. Custom-cut inserts of trademarks, lettering or pictorial representations can be provided. On large jobs, manufacturers' designers work with expert installers in creating distinctive floor treatments.

Repair and Maintenance

Since floor surfaces of this material are composed of individual tiles or special insets, repair of damage is a simple and inexpensive undertaking. Only a few tiles need be replaced instead of a complete recovering job. The material is cemented in place and can be applied on any existing floor.

Because it is laid a tile at a time, installation of an asphalt tile floor need not interfere with normal traffic. Only a small space needs to be blocked off for workmen. The tile can be walked on immediately after laying and workmen can move on to the next section.

Its long-wearing properties, decorative possibilities, and ease of cleaning, combined with low installation and maintenance cost, are the chief factors which have brought asphalt tile into extensive use in theatres and other places of public assembly.

Ordinary sweeping with only occasional washing with water and non-alkali soap or cleaner, and an occasional waxing with a good water emulsion wax recommended by the tile manufacturer is all the attention usually required. Cleaners or waxes containing free fat or oil will soften and disintegrate the asphalt tile. Varnishes, lacquers and the like should never be applied.

Colors, being stable chemical compounds, cannot fade nor bleach, and, because they go clear through the tile from top to bottom, cannot wear off.

Wear Resistance

As an example of the long life of the material, asphalt tile was installed in the Time & Life, Associated Press and 630 Fifth Avenue buildings of Rockerfeller Center when the buildings were erected more than ten years ago. Since that time, it is estimated that the floors have borne a total traffic load of 130,000,000 persons, and yet the floors are still in first-class condition, according to the Center's maintenance men.

In one of the New York World's Fair buildings, floored with asphalt tile, more than 20,000,000 persons were counted walking through the building in two years. After this usage, a section of the floor at the entrance was taken up and subjected to minute laboratory examination. Scientists were able to discover only an infinitesimal loss in thickness.

Moisture Resistance

Resistance to moisture is another important attribute of the material, especially in the case of buildings where concrete on or below grade must have a floor covering. Engineers assert that asphalt tile is virtually the only smooth-surfaced, resilient material that can be successfully used in such locations because it is not affected by dampness which is generally present when concrete is in contact with the ground.

Concrete is considered above grade when it is above ground and has heated and ventilated space beneath. Concrete only slightly above ground and having

no heat and ventilation underneath is subject to approximately the same temperature, moisture and condensation conditions as concrete resting directly on the ground, and should therefore be considered as on-grade.

As an example of the moisture-resistance of the material, floors of asphalt tile which have been under many feet of water and silt for several days in flooded sections of the country, have been found undamaged when the debris was cleared away.

Underfoot Safety

Safety underfoot is another point, because danger of damage suits for personal injury is always present in public gathering places.

According to tests made by the National Bureau of Standards, it is indicated that a person is less likely to slip on asphalt tile than on any other type of smooth-surfaced flooring under most conditions, provided a high-gloss wax coat is absent.

Table 1, showing the anti-slip coefficients of various types of flooring, was developed in the Bureau of Standards tests (Report BMS 100) which were conducted on the original surface of the different materials with no finish added. The types having the highest number are regarded as the safest.

From this data, incidentally, it would appear that a person wearing a leather heel is more likely to slip on any surface than one wearing rubber heels.

The tests indicate that under most conditions, embossed rubber matting is the safest underfoot. However, this material is not widely used as a permanent floor covering. It is usually spread out on a ceramic tile or a terrazzo floor in wet weather to prevent slipping and is then taken up.

MISCELLANEOUS

Some theatres and public halls are built with recessed lobby floors to accommodate a thick rubber mat and it finds some usage in such places. The material does not have a very wide range of decorative possibilities, however. And maintenance departments say that it is not as easy to keep clean as a smooth-surfaced flooring, nor are wearing qualities as good as the harder substances. Where a floor has been recessed to accomodate thick rubber mats, they can be built up to the proper thickness if it is desired to install some other type of flooring.

Decorative possibilities of most of the materials tested by the Bureau of Standards are not regarded by achitects as having the flexibility of asphalt tile since color range is necessarily limited.

Hence, decorators like asphalt tile because it usually can be made to harmonize with any color scheme.

New floor treatments are only part of a general modernization program that is being carried out in theatres and other public gathering places throughout the country as a general trend of community face-lifting which is rapidly gaining momentum following long years of wartime restrictions and shortages.

Theatres have always been the glamour spot in most American communities and are again leading the way in the current rehabilitation program. Installation of air-cooling equipment, thermal insulation, better seats, modernization of lighting, improved equipment, and general refurbishing are all being carried out on a broad scale.

Many a theatre owner who has refurbished his house has soon discovered that the move paid cash dividends through greater patronage. The public is attracted by brightness, cleanliness, color, and comfort, and attraction of patrons is the primary concern of the theatre owner.

TABLE 1—Anti-slip coefficients of various types of flooring under different conditions, as determined by the National Bureau of Standards (Report BMS 100).

Type of Floor	Leather Heel				Rubber Heel			
	Dry, Clean	Dry, Dirty	Wet, Clean	Wet, Dirty	Dry, Clean	Dry, Dirty	Wet, Clean	Wet, Dirty
Asphalt Tile	.55	.44	.18	.11	.91	.44	.29	.26
Battleship Linoleum	.43	.40	.19	.22	.80	.44	.18	.18
Ceramic Tile	.40	.40	.15	.07	.73	.44	.26	.22
Cork Tile	.40	.40	.15	.11	.88	.40	.11	.11
Felt Back Linoleum	.40	.44	.21	.15	.77	.47	.33	.22
Soft Rubber Tile	.44	.47	.18	.18	.80	.51	.28	.26
Rubber Matting (emboss)	.69	.53	.24	.20	.91	.55	.29	.26
Terrazzo	.37	.40	.22	.18	.80	.24	.26	.18
White Oak	.26	.41	.36	.28	.79	.45	.39	.27

THE LOBBY of the Winter Garden Theatre, New York, shows an asphalt tile flooring in a design which utilizes two complementary colors in square tiles and a contrasting darker color in triangular tiles. Many users of asphalt tile have found that the investment has paid off in greater patronage, since the public is attracted by color, comfort, and generally smart appearance of the theatre of its choice.



Review of the Use of Signs and Letters

Pictorial Presentations of Installations Showing the Trend in Modern Front Design

First appearances being lasting ones, one of the major considerations in theatre design is the facade, and particularly the marquee, which of course, includes signs and letters. While on the interior a designer's fancy may be given free rein, the outside must be considered not only from the standpoint of a definite building in a definite community, but also that of advertising and the enticement of potential patrons.

There can, naturally, be no hard and fast set of rules by which this blending of civic fitness and theatre functionalism can be achieved, each situation must be faced individually and its problems solved in the best possible manner. Among the considerations entering the solution of the problems of the facade are those of the site of the theatre in relation to the position of the house in the exhibition setup of the area and to the community as a whole.

In these pages an attempt has been made to show a wide variety of theatre fronts, with divers ideas expressed concerning marquee shape and lighting and the use of modern, silhouette or translucent letters.

Most recent entrant in the field of sign letters are those which have been designed of plastic in such a manner as to give a ribbed, beveled appearance, this third dimensional effect being particularly noticeable when the background glass is illuminated.

Translucent letters are made of a plastic material, known as butyrate thermoplastic. The material is tough and is claimed to be the best of the plastics for use outside against the elements, for it stands temperatures of sub-zero to above 160 degrees. The construction of some letters' center webbing enforces it against both breakage and warpage. By utilizing the lug method of fastening, the rigidity of the letter is not affected. The letters come in different colors.

Manufacturers of letters for theatre signs do not, as a rule, make the signs or attraction boards, these being purchased through the sign man of choice. When signs are designed and built to utilize multiple-size changeable letters, a new message can be displayed every day, adding a powerful point-of-sale advertising force both day and night. There can be displayed special items and prices, services, and attractions.

Changing copy is simplicity itself, taking but a few seconds to change yesterday's advertising message into today's new and freshly interesting one. With a variety of styles and sizes of letters available, it is possible to display signs that shout and possess appealing eye-interest.

Color is easily injected into such displays as an added force by the use of translucent plastic letters. Persons and scenes can also be employed through the use of full-color transparencies.

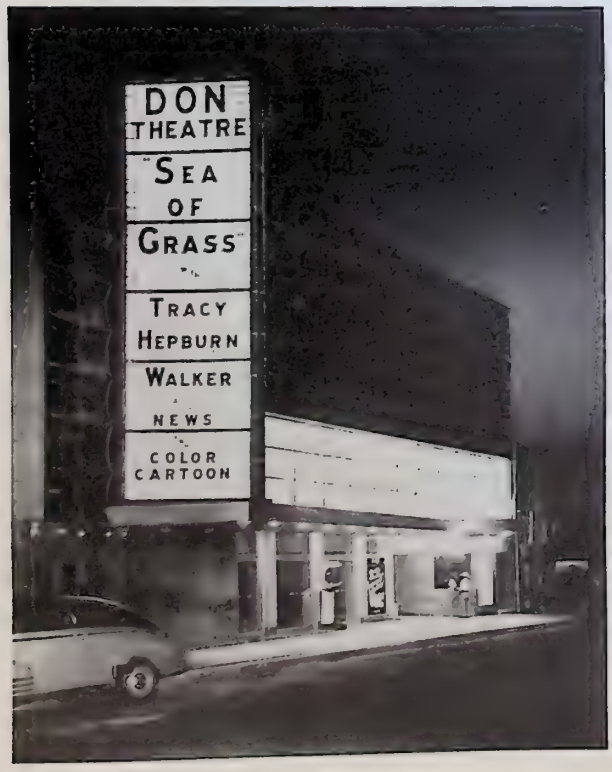
Another display variation is the use of word units. These units consist of miniature frames easily mounted on the standard bar or spacing provided on the sign. Such units save space, permit the better use of space, and make word plates unnecessary.

Pictures of the Don, Plaza, Roosevelt, Broadmoor, Loew's Canal, Royal, RKO Hillstreet, and Colosseum Theatres were provided by the Adler Silhouett Letter Company.

Pictures of the Arden, Bell, Alpha, Coronet, Lakewood, Belmont, Lido, Culver, Boulevard, Bay, Park In, and Ritz Theatres were provided by Theatre Specialties, Inc.

Pictures of the McVickers, Duke, Lancaster, Joy, and Paramount Theatres were provided by Wagner Sign Service, Inc.

THE DON THEATRE, Shreveport, Louisiana



THE PLAZA THEATRE, Oklahoma City, Oklahoma

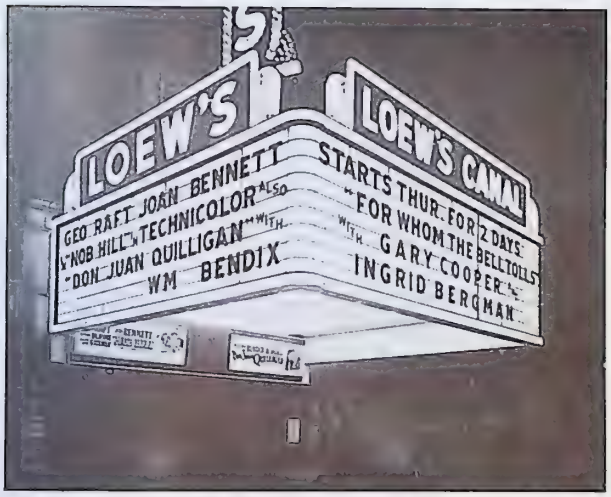




THE ROOSEVELT THEATRE, Jacksonville, Florida



THE BROADMOOR THEATRE, Shreveport, Louisiana



THE LOEW'S CANAL THEATRE, New York, New York

THE RKO HILLSTREET THEATRE, Los Angeles, California



THE ROYAL THEATRE, Victoria, British Columbia, Canada

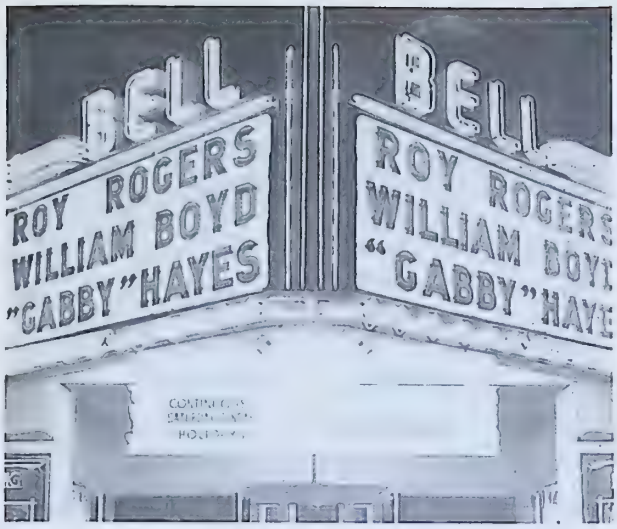
THE COLOSSEUM THEATRE, Johannesburg, Union of South Africa







THE ARDEN THEATRE, Lynwood, California

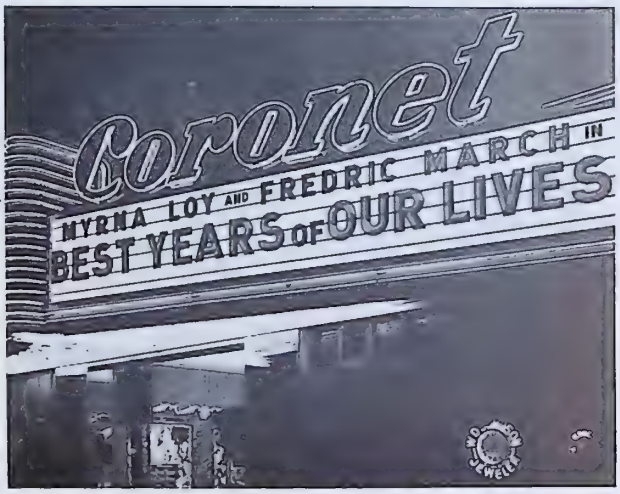


THE BELL THEATRE, Bell California



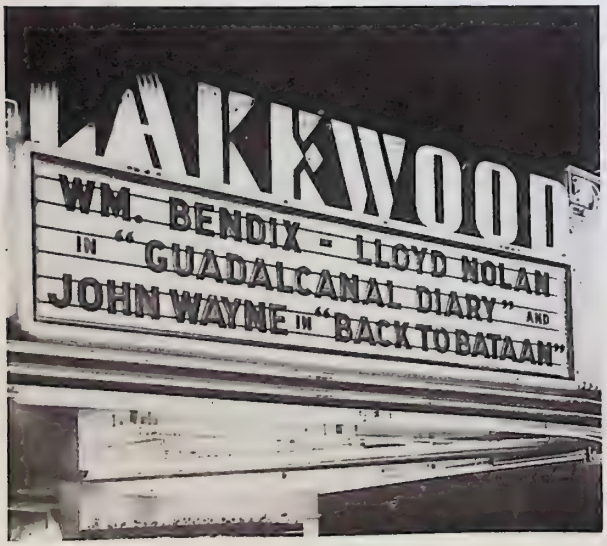
THE ALPHA THEATRE, Bell, California

THE LAKEWOOD THEATRE, North Long Beach, California

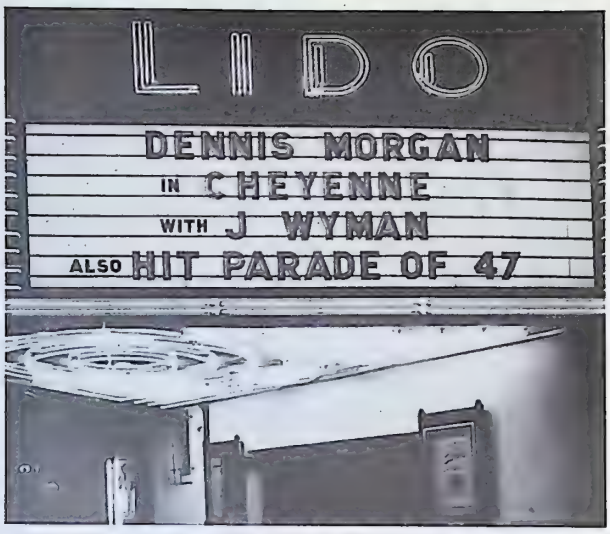


THE CORONET THEATRE, Alhambra, California

THE BELMONT THEATRE, Los Angeles, California





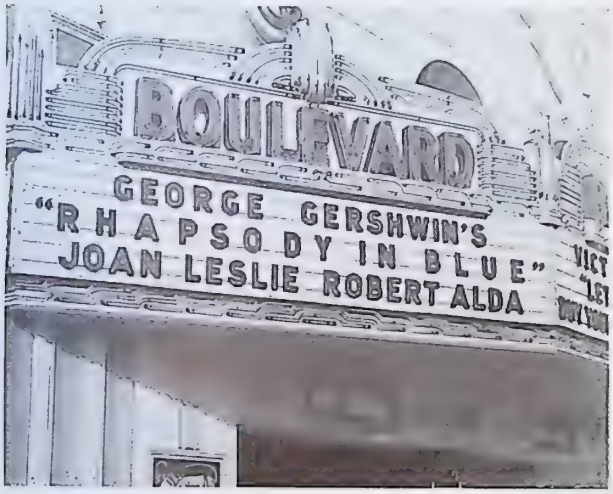


THE LIDO THEATRE, Long Beach (Long Island), New York



THE CULVER THEATRE, Culver City, California

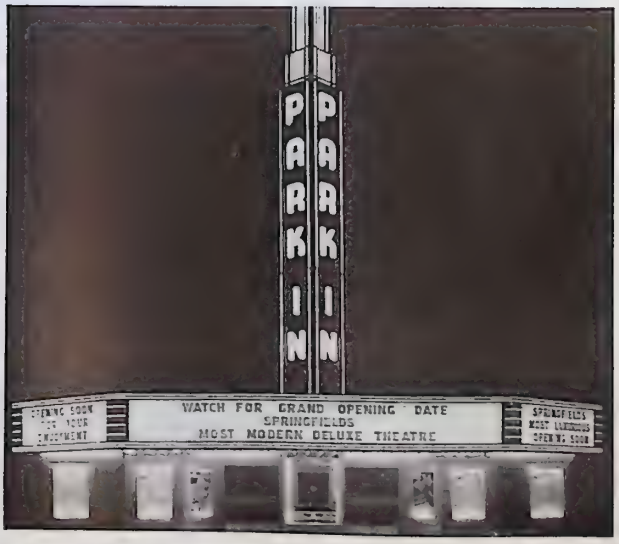
THE BOULEVARD THEATRE, Los Angeles, California



THE BAY THEATRE, Seal Beach, California

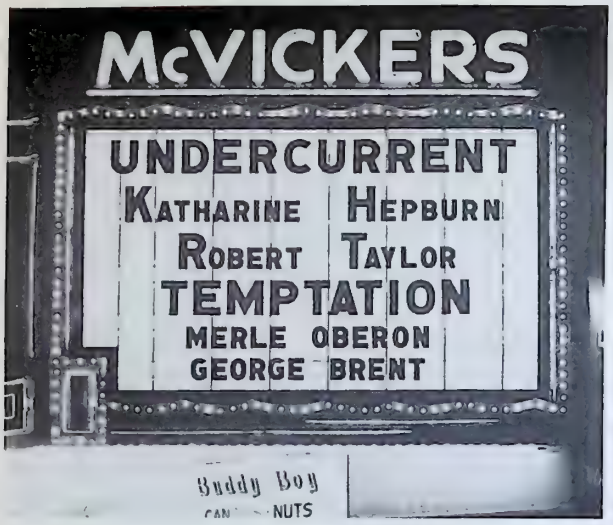


THE PARK IN THEATRE, Springfield, Missouri

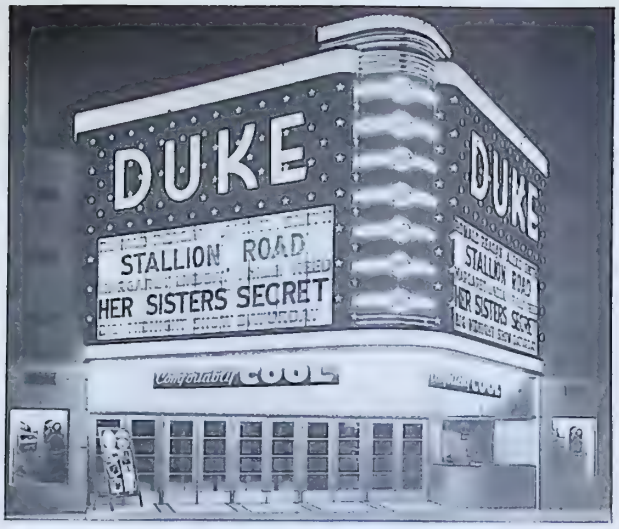


THE RITZ THEATRE, Natchez, Mississippi





THE McVICKERS THEATRE, Chicago, Illinois



THE DUKE THEATRE, Detroit, Michigan

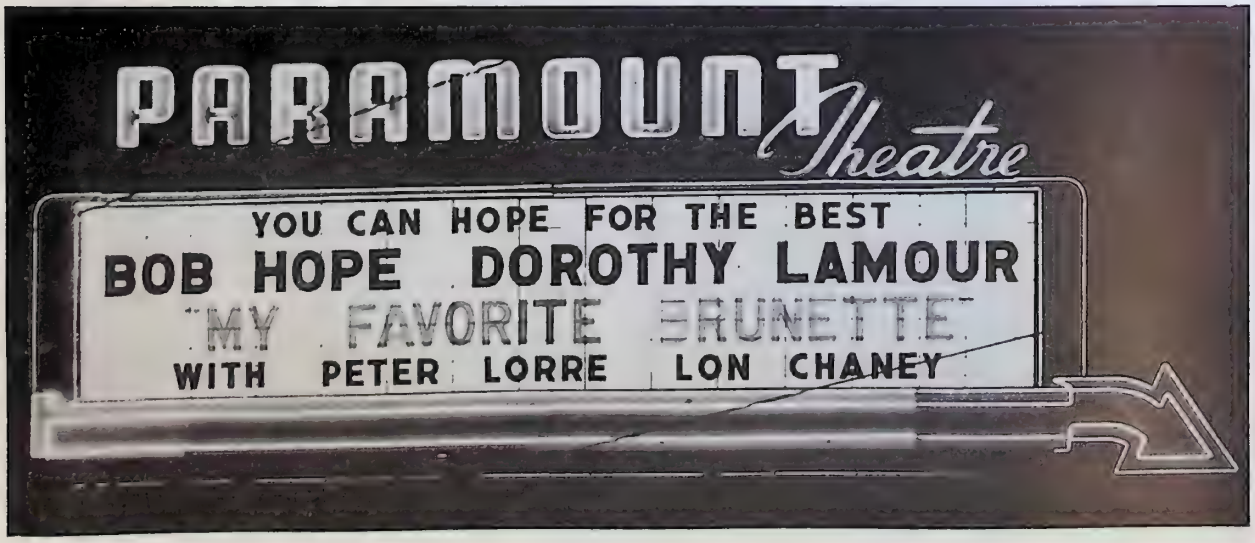


THE LANCASTER THEATRE, Detroit, Michigan



THE JOY THEATRE, New Orleans, Louisiana

THE PARAMOUNT THEATRE, Hollywood, California



WAGNER SIGN SERVICE, INC.

Presents

THE LARGEST LINE *of Quality* MARQUEE DISPLAY EQUIPMENT *in the World*

Designed for powerful attention value and effective selling

Your front and marquee are worth a lot of money to you if used properly. Cash in on them!

Focus interest upon your theatre . . . compel attention to your offering . . . outsell your competition . . . build your grosses by billing every attraction as a big event.

If you want to put these forces to work for you and don't know how or where to begin, we will be glad to extend to you our complete planning service. Forward a photograph or rough layout of your front, and marquee, if you have one, and we will offer our recommendations.

- GIANT WINDOW-TYPE FRAMES
- MASTER MULTIPLE MOUNTING FRAMES
- COLORED TRANSLUCENT PLASTIC LETTERS
- ALUMINUM SILHOUETTE COVE LETTERS
- LOBBY DISPLAY UNITS
- COLORED PHOTOGRAPHIC TRANSPARENCIES
- LETTER MOUNTING STRIPS
- FLEX-WORD UNITS
- DISPLAY FRAME GLASS

FREE catalog on all Wagner products sent on request

Wagner Sign Service, Inc.

218 S. Hoyne Avenue
CHICAGO 12, ILL.

Name and address of your nearest Wagner theatre supply dealer or sign shop sent on request

WAGNER STAINLESS STEEL FRAME AND GLASS UNITS

Wagner Master Multiple Frames employ a series of stainless steel bars spaced on 7" centers, and accommodate any and all sizes of Wagner Letters, since these letters are slotted with uniform spacing. (An exclusive patented feature.)

"39" and "41" MODELS RECOMMENDED FOR OPENINGS UP TO, AND INCLUDING 43"

In the "39" type 3-in-1 Unit the frame inserts in a channel at top and bottom. It has no drain flange.

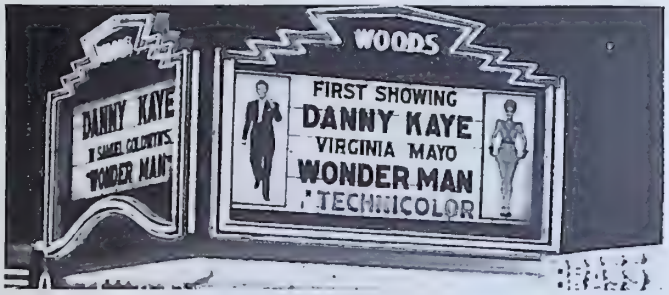
In the "41" type 3-in-1 Unit the frame inserts in a ¾" wide by 1½" deep channel at top and has a drain flange which sets over rail at bottom.

WAGNER WINDOW-TYPE FRAME AND GLASS UNITS

(PATENT PENDING)

The only marquee frame which affords billing space of any height or length. Accommodates the smallest to the largest letters and life-size photo transparencies.
Installed separately and before the glass. Lamps, neon and glass removed, cleaned and replaced without removing frames. No shopwork necessary in the event of glass breakage.

All parts of the sign may be serviced through open windows. Lamps are replaced as easily as though they were exposed. These frames within two years will accordingly pay for themselves by elimination of maintenance costs necessary with any other large multiple type frame of four rows of ten-inch letters or over.



HERE'S HOW IT WORKS!



1. The maintenance man raises a window to gain access to the inside of the sign.



2. The window is held open by a small hook. Both hands are free to work inside the sign.



3. This is a rear view of one window panel. All panels, except the top one, slide in narrow guide channels, placed at such an angle that each glass slides behind the one above. The glass may be removed by simply raising the panel above the top of the channels.



4. This is a rear view of the top panel. Note the short channels at top and bottom. By simply raising this panel above the bottom channel and bringing it down inside the sign the glass may be removed.

Wagner Sign Service, Inc.
218 S. Hoyne Avenue
CHICAGO 12, ILL.

WAGNER LOBBY DISPLAY UNITS



An effective medium for selling ***coming attractions*** to the outgoing crowds.

Made of sheet steel, with attractive white enamel finish. Easy to install. Just slip the top flange of the frame into the slot at the top of the wall plate, and drop the flange at the bottom of the frame into the slot at the bottom of the wall plate. No bolts show.

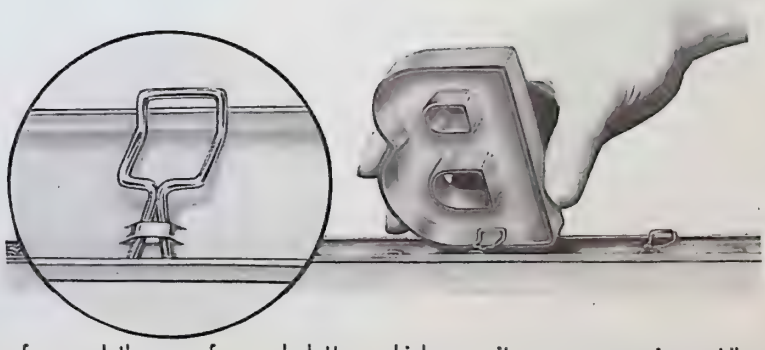
Made in standard sections 24", 36" and 48", which can be combined to make up any desired length. Each unit is 7" high, with two sockets per lineal foot.

Wagner Slotted Plastic Letters are mounted on the bars in the middle, or firmly held in "standee" position at the top, or suspended from the bottom by clips. There are sufficient clips to allow proper spacing of letters.

WAGNER MOUNTING STRIP FOR PLASTIC LETTERS

Wagner Translucent Plastic Colored Letters are easily adaptable to any arrangement or conditions within the theatre by using the sheet steel, white enamel finished mounting strips designed for this flexible use.

These letters occupy such small space that they can be set up on ledges, and many other places where no other display equipment could possibly be used. No special wiring is necessary and no alterations are required.



Drilled for mounting with nails or screws onto any cove, sill or other wood foundation, these mounting strips can be placed on top of a wood surface and the letters mounted in the "standee" position, or the strips can be fastened on the under side of a wood surface and the letters used in suspended position.

In determining the lengths of mounting strip needed for any number of letters, estimate as follows: for 4-inch letters, allow 4 inches of space on the mounting strip for each letter, which permits proper spacing. Allow 4 inches of space between words. For 10-inch letters, allow 10 inches of space on the strip for each letter, and 10 inches of space between words.

Mounting strips come complete, including necessary attached clips for holding letters in position, drilled and ready for installation.

Wagner Sign Service, Inc.
218 S. Hoyne Avenue
CHICAGO 12, ILL.

WAGNER SLOTTED TRANSLUCENT COLORED PLASTIC CHANGEABLE LETTERS*

FOR EFFECTIVE SHOW SELLING

Wagner Multi-Size Translucent Colored Plastic Changeable Letters are the modern means of attracting attention and business.

They afford a vivid, colorful display—impossible with other letters. Gorgeously brilliant when light shines through them, they also assume sharply silhouetted third dimensional effect by day.

They More Than Double the Effectiveness of Your Sign

Available in 4", 8", 10" and 17" sizes in red, green, and blue, and 4", 8" and 10" sizes in amber.

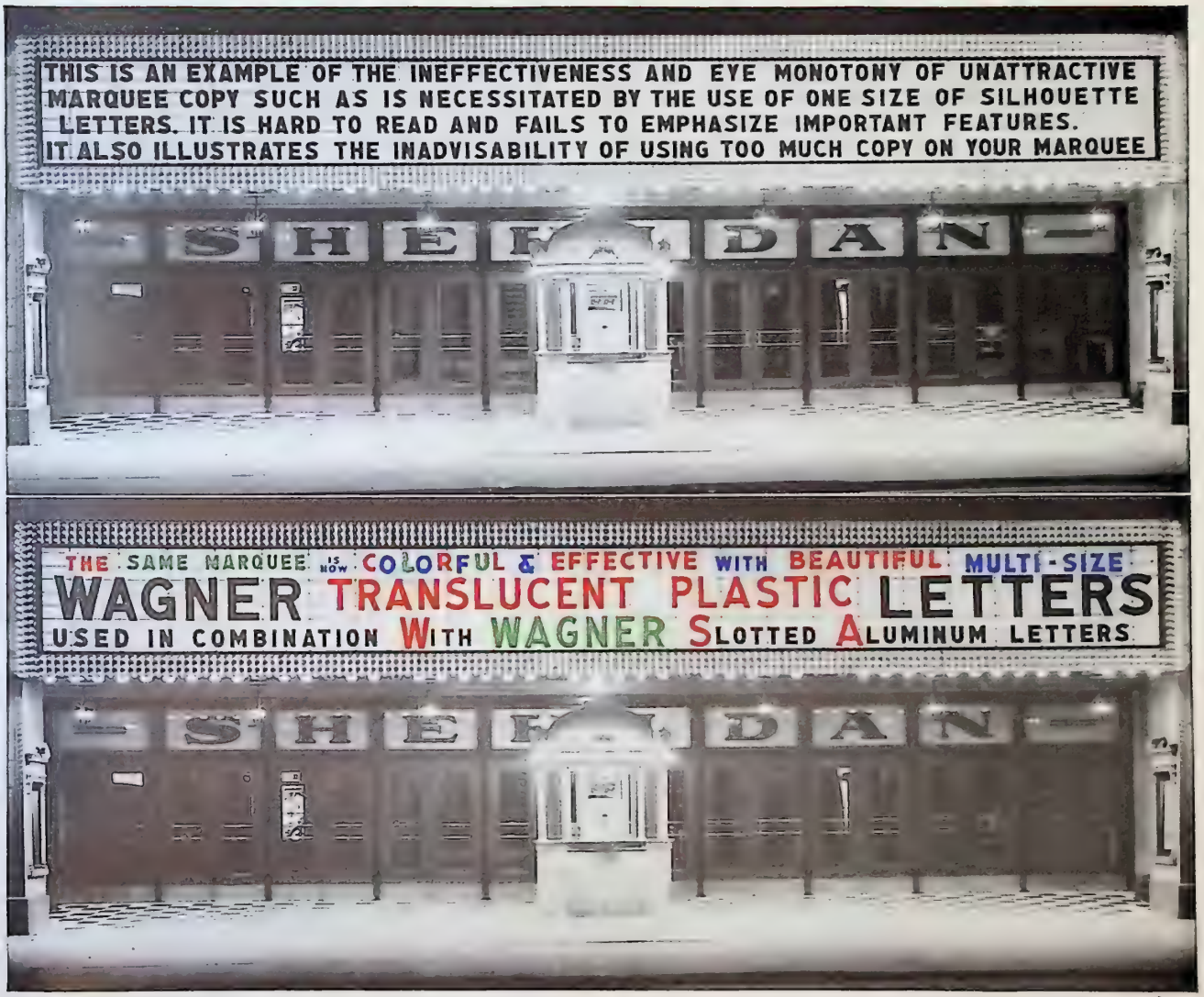
The everlasting, non-fading colors go all the way through the letters, hence cannot chip or scale. Furthermore, these strong, durable letters never require painting or other maintenance.



Wagner Sign Service, Inc.
218 S. Hoyne Avenue
CHICAGO 12, ILL.

WAGNER SLOTTED TRANSLUCENT COLORED PLASTIC CHANGEABLE LETTERS*

GOOD SHOWMANSHIP DICTATES THEIR USE

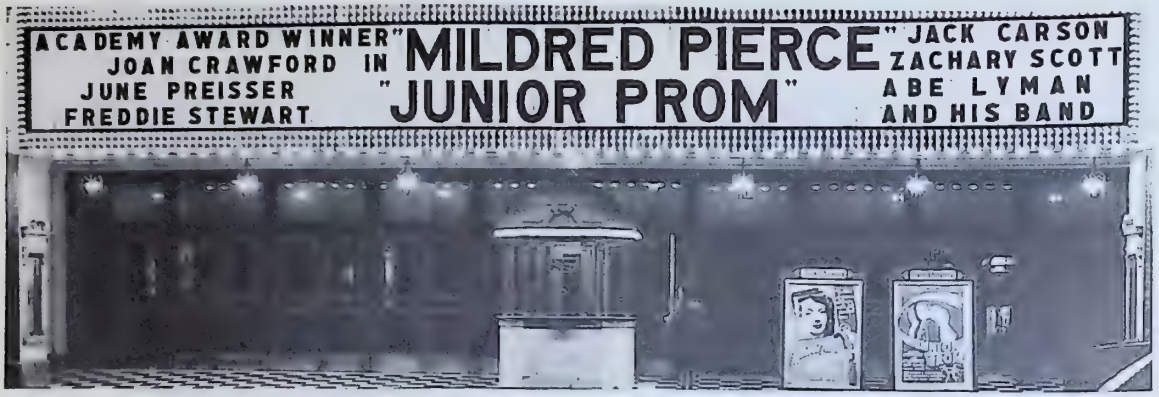


Interchangeable, they do double duty, as they can be used outside on the marquee or inside in Wagner lobby displays. The 4" letters can be used with Wagner Flex-Word Units for word plates.

* Slotted letters are patented and available exclusively from Wagner. Patent 2048040 (adjudicated) and many other patents. Wagner's exclusive slotted method of mounting plastic and aluminum letters allows more than six times the bearing surface of the lug type letter. No other letters afford such complete safety! Wagner letters cannot freeze to the sign as in the case of letters designed for mounting arrangements which employ channels.

Wagner Sign Service, Inc.
218 S. Hoyne Avenue
CHICAGO 12, ILL.

WAGNER SLOTTED ALUMINUM LETTERS

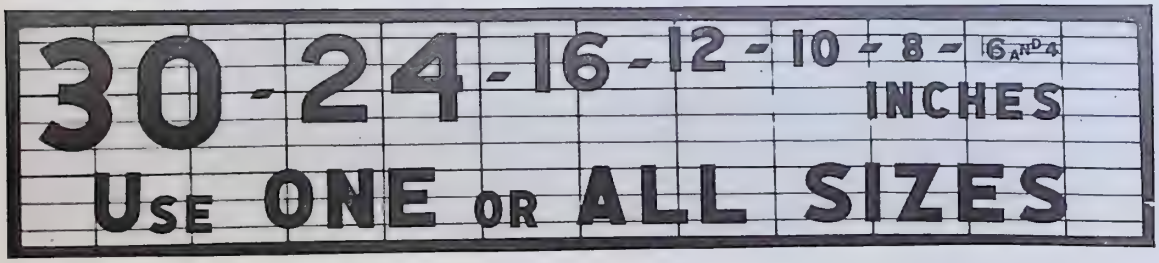


All sizes of Wagner Aluminum Letters are slotted with uniform spacing so that ANY and ALL sizes can be used in the Wagner Multiple Frame. This is an exclusive patented feature.





These letters are frequently used where especially large letters are desirable and in combination with translucent colored plastic letters.



Wagner Aluminum Letters are available in a wide variety of colors, finishes and styles of type. Solid Color Cove Letters are made in 4", 8", 10", 12", 16", 24" and 30" sizes. Colored or Aluminum Cove Edge Letters are made in 4", 8", 10", 12", 16", 24" and 30" sizes. Gothic Letters are made in 6", 8", 10" and 12" sizes, and Poster Letters are made in 8" and 10" sizes.

Wagner Sign Service, Inc.
218 S. Hoyne Avenue
CHICAGO 12, ILL.

WAGNER TRANSPARENCIES AND TRANSPARENCY FRAMES

Designed to inject the compelling power of colored photographic realism in marquee displays on current showings and to advantageously exploit coming attractions in lobbies.

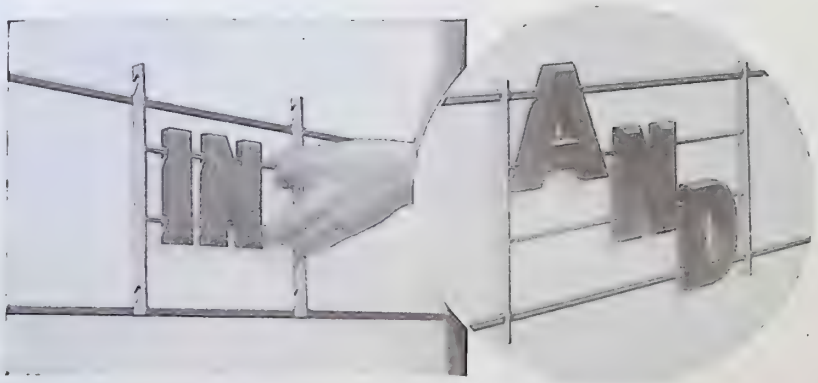
These brilliant, full-colored transparencies available on all stars and in any size up to life-size and larger to fit Wagner Transparency Frames, which in turn fit any Wagner Master Multiple Frame, the same as letters.



Shadow boxes are available to fit any transparency frame or may be made by your sign man. Specifications will be furnished on request and without obligation.

Wagner Transparency Frames are available in size 21¾" x 25¾" to accommodate 21" x 25" transparencies and in size 30¾" x 40¾" to accommodate 30" x 40" transparencies. Larger sizes on special order.

WAGNER FLEX-WORD UNITS



These miniature frames mount on standard Wagner frames of 7-inch bar spacing and provide for the easy forming of units of less important words with 4-inch letters. They save space, permit better use of space and make word-plates unnecessary. Wagner 4-inch letters are uniformly slotted and thus are interchangeable for this purpose and permit the greatest contrast when used in connection with Wagner Multi-Size Letters.

Flex-Word Units are extremely flexible. The 4-inch letters can be staggered in three lines, or two straight lines can be used in a space that ordinarily accommodates one row of 10" letters, as shown in the illustration. Flex-Word Frames are available for either straight or curved attraction boards. Two or more Flex-Word Frames can be butted together to handle long words. Properly spaced, 4-inch letters require approximately four inches of horizontal space per letter.

Wagner Flex-Word Frames are available in horizontal lengths of 8, 12, 16, 20 and 24 inches.

Wagner Sign Service, Inc.
218 S. Hoyne Avenue
CHICAGO 12, ILL.

Sell Every Picture As A BIG SHOW!

Your attraction board is your best advertising medium. Make proper use of it!

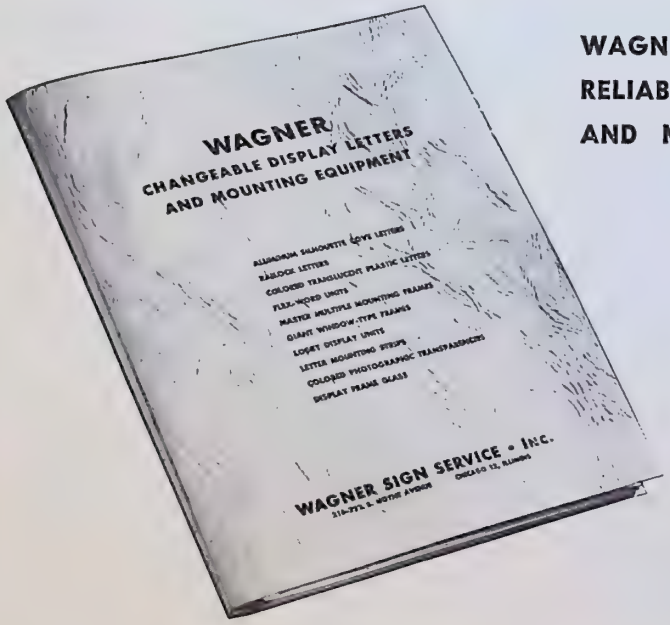
AVOID THE EYE-MONOTONY OF ONE-SIZE LETTER COPY

With all the sizes, styles and colors available in Wagner Multi-Size Letters it is easy to arrange a display that is attractive, interesting, effective!

If you have only aluminum letters now, obtain enough Wagner Translucent Colored Plastic Letters to use both kinds in combination. You will find that they work wonders in attracting attention.

Changing copy is simple BUT it deserves the attention of the best man in your organization. He alone should write and lay out your copy and check it for proper installation.

Use Wagner Scaled Rubber Stamps and Layout Sheets



WAGNER PRODUCTS ARE SOLD BY RELIABLE THEATRE SUPPLY DEALERS AND MARQUEE MANUFACTURERS IN YOUR TERRITORY

FREE! ***Write today for your copy of this big catalog of effective show-selling equipment.***

Wagner Sign Service, Inc.
218 S. Hoyne Avenue
CHICAGO 12, ILL.

Brief Pictorial Review of Foreign Theatres

Newer Constructions of Functional Design Show Way of Replacing Antiquated Cinemas

Throughout the world, by and the large, theatres showing motion pictures seem to be still in a transition era, architecturally speaking, in that period when a few brave souls utilized the facilities at hand and even fewer dared the investment of cinemas designed for that particular purpose.

Yet beside these olden facilities—which the post-war years will probably eventually replace—stand theatres, in the less war-stricken countries, however, that are models of modern design. Here are collected pictures of 28 theatres from 19 countries, and presented as a review of what the situation is today and to suggest, through some later constructions, the trend in theatre design.

From a cursory examination of these pictures, it would appear that marquee signwork is an American characteristic. Accordingly, it is probably no accident that the newer theatres of Loew's International Corporation, for example, are in every line strictly American whatever the locale. Yet the American influence is not the only one at work in theatre design, for in every country architects are becoming more functionally minded and are designing theatres more closely approximating a cinematic idealism.

There is a long road ahead, not only in bringing this ideal theatre into being, but, in the meantime, bringing better and more up-to-date theatres to those communities—and many a metropolitan center falls in the category — lacking wholly satisfactory facilities for movies.

For this material grateful appreciation is expressed to the international departments of the producing organizations mentioned in each caption.



ALOHA THEATRE, Helsinki, Finland, presents a striking appearance with the standee letters of the theatre name surmounting an up-turned marquee. Odd as it may appear, it did not deter the people from flocking to see RKO Radio's "A Lady Takes a Chance." Display material is in poster frames.



METRO THEATRE, Durban, Union of South Africa, is a strikingly modern structure, whose design shows kinship to other Metro Theatres shown in these pages. And the customers line for for MGM's "Maytime" in the Dark (?) Continent just as they do at 51st Street and Broadway in New York.

LEICESTER SQUARE THEATRE, London, England, emulates New York's Broadway and covers available areas with large signs, the design of the structure not permitting marquee display. The displays for the RKO Radic —Rank production, "So Well Remembered," are used on two streets.



MARIGNAN THEATRE, Paris, France, with no marquee at all, has a "shelf" at the second-floor level which is utilized to display the theatre name—as well as that of shops in the building. The display for RKO Radio's "Man about Town" is a specially painted affair set above the doors.





SENTRUM THEATRE, Oslo, Norway, is one of that small group of theatres using a capital and small letters in the name sign, here made perhaps even more striking by having the individual letters surmounting at its outer edge the substantially supported marquee. Instead of sign letters, specially painted displays were used on the sides of the marquee for RKO Radio's "The Bells of Saint Mary."

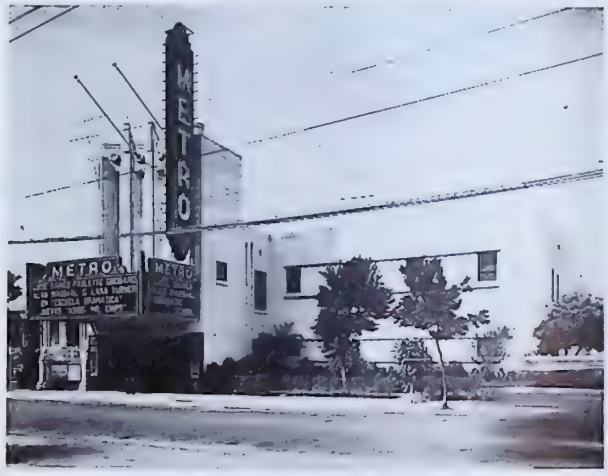


ADRIANO THEATRE, Rome, Italy, seems to be an old house adapted to motion-pictures, with the advertising on 20th Century-Fox's "Hangover Square" limited to a title sign and available paper.

GRAN REX THEATRE, Buenos Aires, Argentina, where 20th Century-Fox's "A Yank in the R. A. F." is currently on view, presents an unusual appearance at night, when the patrons strolling on the theatre's three promenade levels can be seen through the facade, a gigantic window.



METRO THEATRE, San Juan, Puero Rico, whose front is dominated by a large upright sign, has also a marquee of ample proportions, sufficiently to announce the presence of MGM's "Dramatic School" and the coming of MGM's "Goodbye, Mr. Chips." Signwork is in contrast to the white stone.



METRO THEATRE, Calcutta, India, is typically American in conception and execution, with typical upright sign and marquee program space, here used for MGM's "Captains Courageous." The white of the structural building, and the preponderantly white garb of the populace make the translucent letters, with their black background, more striking than might be expected in more moderate climates.



LYNX THEATRE, Paris, France, is designed so that the whole front becomes an advertising medium with special displays, as for this Warner Brothers release "La Caravane Heroique."





ORPHEUS THEATRE, Athens, Greece, for the run of Warner Brothers' "The Constant Nymph," went in for a special front. The design of the front seems to have omitted marquee space, with only the name of the theatre in ligh̄s to attract attention. That done, the false front does the rest of he job.



EMPIRE THEATRE, London, England, lacking dominating display space on the marquee for announcing 20th Century-Fox's "This above All," utilizes extra large letters on a framework erected on the front of the theatre above the marquee. During the war, paint may have had to substitute for light.

CENTRAL THEATRE, Panama City, Panama, has the facade developed as a gigantic name sign, augmented by a vertical sign and a brilliant marquee, announcing Monogram's "Suspense."



RIALTO THEATRE, Caracas, Venezuela, possesses an unusual name sign, made of single letters, outlined with neon tubing, set in an unlighted frame for support. Without backing, the letters at first glance seem to be suspended in space. Display material for Warner Brothers' "Of Human Bondage" in this case appears to be materials—posters and still, and a standee—available from the exchange.

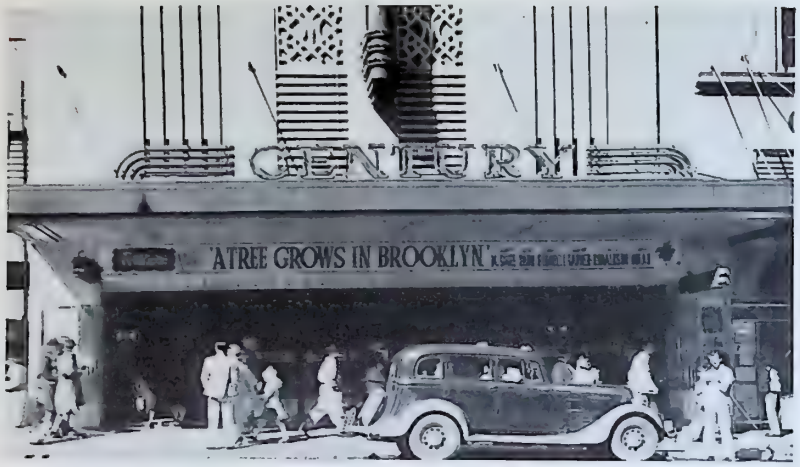


GRAND THEATRE, Shanghai, China, with only the cinema's name to adorn the face of the marquee, constructed on top of it a display for Warner Brothers' "King's Row" with titles and cast in Chinese characters as well as in English. Much glass was used in the front and at the entrance.



NORMANDIE THEATRE, Cantiago, Chile, with no program board in the usual sense, uses stand-up letters to announce the playing of 20th Century-Fox's "Berlin Correspondent." Floodlighting the facade from the top of the marquee would, of course, set off the picture's title effectively in nighttime.





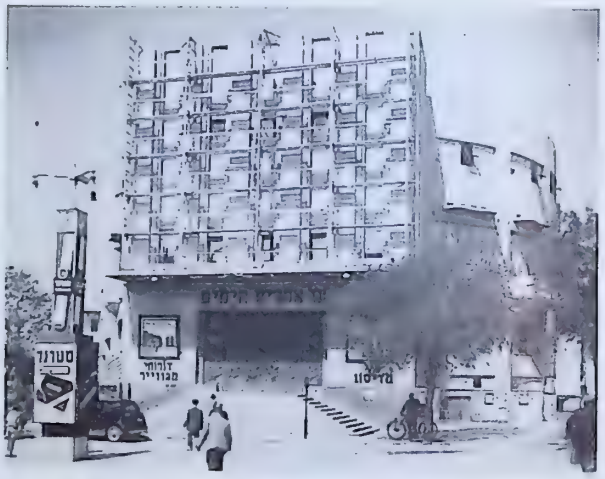
CENTURY THEATRE, Sydney, Australia, is adorned with an upright sign, the bottom of which can be seen, and standee letters surmounting the front edge of the plain marquee. Advertising for 20th Century-Fox's "A Tree Grows in Brooklyn" is held to a banner across the front above the doors and to display material set in corner frames. A sign over the sidewalk at each end of marquee announce the theatre.



METRO THEATRE, Antwerp, Belgium, unlike other cinemas of the ilk, has no marquee. A 24-sheet over the box office announces (in three languages) MGM's show, "Valley of Decision."



PALACIO THEATRE, Rio de Janiero, Brazil, crowded for the opening of 20th Century's "Anna and the King of Siam," is dominated by an American-type square marquee, utilizing two sizes of silhouette letters. Note the display given the producer, as well as the starting times of the five shows.



OPERA THEATRE, Tel-Aviv, Palestine, where RKO Radio's "Till the End of Time" is the attraction, is in the process of having the facade fixed up (the "lattice" is, of course, scaffolding). The flight of steps and the lack of usual theatrical decoration give the edifice the aspect of a Greek temple.

REGAL THEATRE, Bombay, India, prepared for 20th Century-Fox's "The Rains Came" a display which is in strict keeping with the architectural theme of the building. Indeed, it might even be part of a permanent display piece. Note here the use of the company insigne, surmounting the wall at a point of vantage. A 24-sheet adds to the display for attracting the public's attention to the current picture.



METRO THEATRE, Brisbane, Australia, utilizes the traditional American plan of upright sign and marquee, the latter here announcing the short subjects along with MGM's "Love on the Run."





REX THEATRE, Athens, Greece, bears its Latin name in neon-accentuated script letters affixed to the facade. Atop the shelf-thin marquee is a display for 20th Century-Fox's "Blood and Sand."



OPERA THEATRE, Buenos Aires, Argentina, presents an interesting front when adorned for the run of Warner Brothers' "Humoresque." The soffit of the up-tilted marquee is set with four circular coves for lighting, and the one line of letters around the perimeter is back lighted. The marquee is surmounted by the theatre name in individual letters. A special display was designed and placed atop marquee.



GAUMONT PALACE THEATRE, Paris, France, fronting at the peak of a triangle, has its truncated tip designed so as to form display space for photographic enlargements, as done here for 20th Century-Fox's "Son of Fury." Between the name sign and the display are three lines of letters.



METRO THEATRE, Bombay, India, already for the opening attraction, MGM's "Broadway Melody of 1938," is a modern structure, with plenty of display space on the marquee, which has considerable footage on two streets. Here again a play is made on the producer of the pictures the theatre will show.

TRIOMPHE THEATRE, Paris, France, appears to be a little theatre, with even the marquee reduced to an upturned soffit, but the patrons line up to see Warner Brothers' "Rhapsody in Blue."



PALLADIUM THEATRE, Stockholm, Sweden, while floodlighting the lower part of the facade and with a small amount of signwork, relied on a specially designed false front for the run of RKO Radio's "Tarzan and the Amazons." What the theatre might possibly lose, by American standards, by the lack of front lighting and signwork, it seems to gain by the design of the display and the colors that are used.



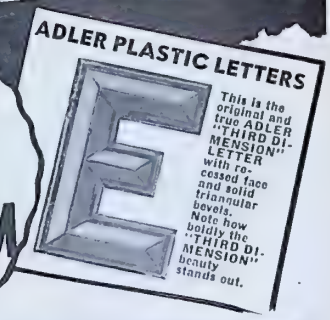
ADLER

"THIRD DIMENSION" LETTERS

For Interchangeable Use

in Many Sizes on Stainless Steel Locked-in-Line, Multi-Decker Glass-in-Frame Units.

PLASTIC and ALUMINUM



ADLER "THIRD DIMENSION" PLASTIC LETTERS

Strongest and Toughest by Far!

Because of the famous, exclusive, original Adler "THIRD DIMENSION" design, new strength and toughness are now combined for the first time in plastic letters, with the brilliant beauty of translucent colors.

Extra thick construction, with solid triangular bevels almost ⅜" on sides—the heaviest plastic letter available. Practically unbreakable—you can twist it and watch this Adler Plastic Letter resume its original shape, unharmed. Supporting means molded integral with letter—will not break off.

ADLER "THIRD DIMENSION" CAST ALUMINUM LETTERS

4"-6"-8"-10"-12"-16"-24" SIZES. Bold, brilliant display in all popular sizes and many colors. An investment in permanence with no replacement cost, because sold under positive guarantee that FOR EVERY ADLER CAST ALUMINUM LETTER YOU BREAK, WE GIVE YOU A NEW ONE FREE.

TAKE ADVANTAGE OF THESE MANY BIG ADLER FEATURES

"THIRD DIMENSION" PLASTIC LETTERS in popular sizes, used interchangeably on same frames with Adler Cast Aluminum "Third Dimension" Letters. Furnished in red, green, blue and amber.

"THIRD DIMENSION" CAST ALUMINUM LETTERS in 4"-6"-8"-10"-12"-16"-24" sizes, for interchangeable use of all sizes, from 8" to 24".

"REMOVA-PANEL" EQUIPMENT — time-tried, exclusive — money-saving. Never necessary to remove any frame for maintenance.

MULTI-DECKER FRAMES FOR INTERCHANGEABLE USE OF 8"-10"-12"-16"-24" "THIRD DIMENSION" LETTERS.

LOCKED-IN-LINE FRAMES Stainless Steel—strong, rigid, skyscraper-like construction—light-tight joints.

GLASS-IN-FRAME CONSTRUCTION — we furnish the glass and glaze frames complete before shipment.

FRAMES SET DIRECTLY IN GROOVES OF SIGN—no changes required—no clips to scratch the surface.

POPULAR 10"-16"-24" COMBINATION—letters line up perfectly—use larger letters as Capitals or for STARS and TITLES.

TOUGH, BAKED FINISH ON CAST ALUMINUM LETTERS—for long, satisfactory service.

ATTRACTIVE COLORS — standard finish on Cast Aluminum Letters, black face and silver bevels. Red, blue, green, amber or other colors furnished. PLASTIC Letters in solid, permanent colors throughout—red, green, blue and amber.

⅞" WIDE GROOVE CONSTRUCTION—recommended, but we also furnish frames to fit existing grooves as narrow as ½" wide.

CURVED MARQUEE OR MITRED FRAMES—furnished.

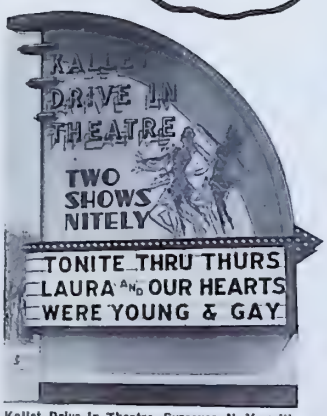
WONDERFUL FOR REPLACING OLD STYLE LETTERS. We furnish frames to fit any existing grooves, down to ½" wide.

APPROVED BY UNDERWRITERS' LABORATORIES, INC.

LETTERS GUARANTEED — For every Adler Cast Aluminum letter you break, we give you a new one FREE.

WRITE FOR COMPLETE INFORMATION—

No obligation.



Kallet Drive-In Theatre, Syracuse, N. Y., with modern Adler 10" "Third Dimension" Letters and Glass-In-Frame Units. Adler equipment is perfectly adapted to Drive-In Theatres, for signs of any shape, size or location.



Miami Theatre, Miami, Florida, with all-curved marquee utilizing 10" and 16" Adler "Third Dimension" Letters on stainless steel Glass-in-Frame Units.



HIGH CHANGEABLE LETTER SIGNS LIKE THIS ARE MADE POSSIBLE BY ADLER PATENTED "REMOVA-PANEL" FRAMES

Don Theatre, Shreveport, La. V-shaped vertical attraction board 30 ft. high—THE HIGHEST CHANGEABLE LETTER SIGN EVER BUILT. 10"-12"-16"-24" Adler "Third Dimension" Letters used interchangeably on "Remova-Panel" Glass-in-Frame Units.



Avon Theatre, Savannah, Ga., with all-curved marquee displaying 10" and 16" Adler "Third Dimension" Letters on curved Glass-in-Frame Units.



Colosseum Theatre, Johannesburg, South Africa, with 8" and 16" Adler "Third Dimension" Letters supported on the same frames. Adler equipment is in use the world over.

Exclusive STAINLESS STEEL "REMOVA-PANEL" Glass-in-Frame EQUIPMENT Saves

ITS COST FAST IN SIGN MAINTENANCE!

Cuts time and labor for cleaning, repairs, replacing lamps or tubing. Simply swing out or remove entirely the small lightweight patented "REMOVA-PANEL," approximately 7" x 27", instead of lifting out large, heavy glass-in-frame units with glass.

For Neon or Fluorescent Tubing or Ordinary Lamps

For Fluorescent Tubing, you can reach in and put a jumper across if a tube burns out, and thus keep the sign operating. Patented "REMOVA-PANEL" units alternate with Regular Type units in the opening, as furnished. Every panel between all horizontal letter bars in standard patented "REMOVA-PANEL" units, is a removable panel.

Over 6 Years of Perfect Success!



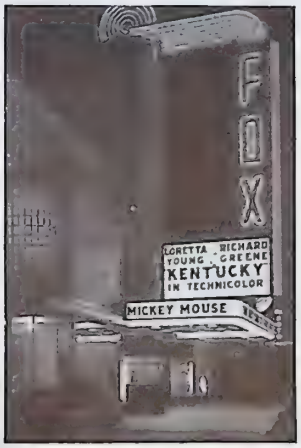
Neon Tubing being lifted out through "REMOVA-PANEL."



Ordinary lamps easily accessible through "REMOVA-PANEL."



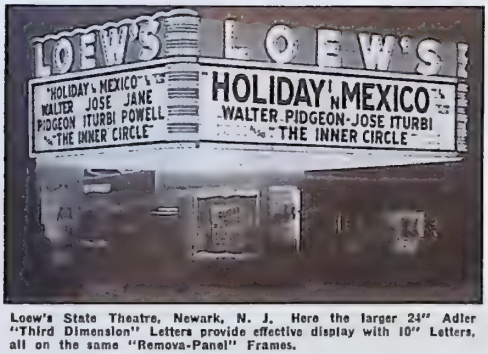
RKO Hillstreet Theatre, Los Angeles, Calif., a large, modern straight and curved marquee with 10" and 16" Adler "Third Dimension" Letters on "Remova-Panel" frame equipment.



A Fox Theatre installation of 10" and 16" Adler Letters used interchangeably on Adler Frame and Glass Equipment.



Warner's Earle Theatre, Washington, D. C., with visible opening 32' long x 5' high (7½ lines). Outstanding display of 8"-12"-16"-24" Adler "Third Dimension" Letters on "Remova-Panel" Frames. In successful use since 1941.



Loew's State Theatre, Newark, N. J. Here the larger 24" Adler "Third Dimension" Letters provide effective display with 10" Letters, all on the same "Remova-Panel" Frames.

ADLER CHANGEABLE PROGRAM DISPLAYS ARE IN USE BY THE NATION'S OUTSTANDING CIRCUITS, AS WELL AS LEADING INDEPENDENTS



PARAMOUNT

Plaza Theatre, Oklahoma City Okla., showing double-faced, modern, vertical, tapering sign with 8" and 12" Adler "Third Dimension" Letters on "Remova-Panel" Frames.

ADLER "3RD DIMENSION" LETTERS FOR MODERN DISPLAY ALL SIZES 8" TO 24" INTER-CHANGEABLE

UNITED STATES PATENTS		Canadian Patents
No. 1,830,414	No. 2,163,298	No. 369,858
No. 1,989,855	No. 2,272,733	No. 411,691
No. 2,038,978	No. 2,284,626	
No. 2,113,285	No. 2,313,723	No. 421,193
No. 2,144,954	No. 2,313,724	England Patent
No. 2,155,904	No. 2,319,910	No. 442,512
No. 2,156,257		

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The new BEVELITE Plexiglass panels provide a clear, white, translucent field. These sliding "showcase" type panels allow lighting to be serviced with the same ease as changing a letter.

BEVELITE Plexiglass background panels are manufactured of the new war-tested Plexiglass and (1) Will not fade, (2) Will not warp, (3) Have successfully withstood extreme changes in temperature ranging from 70° F. below zero to 187° F. above, (4) Light transmission better than glass, (5) Color uniform throughout, and (6) Unbreakable.

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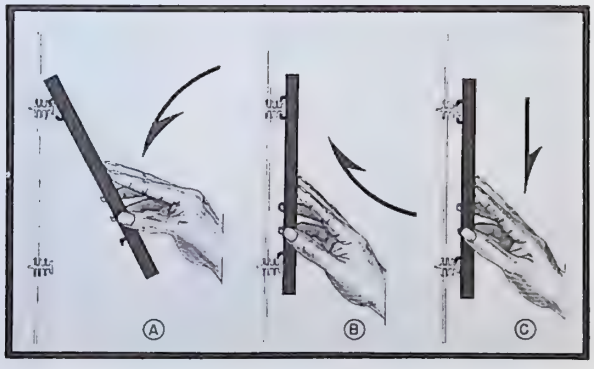
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Closeup of marquee showing sliding BEVELITE Plexiglass (or glass) panels in open position





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As the name implies, the new Lock-Lug construction makes it possible to actually "lock" each letter into position on the marquee.

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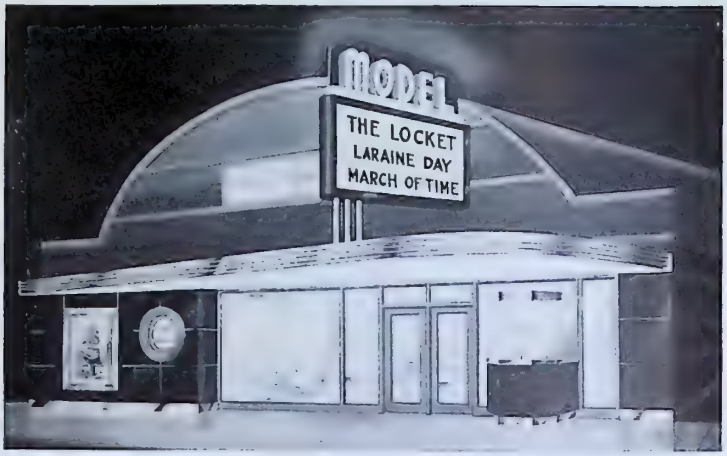
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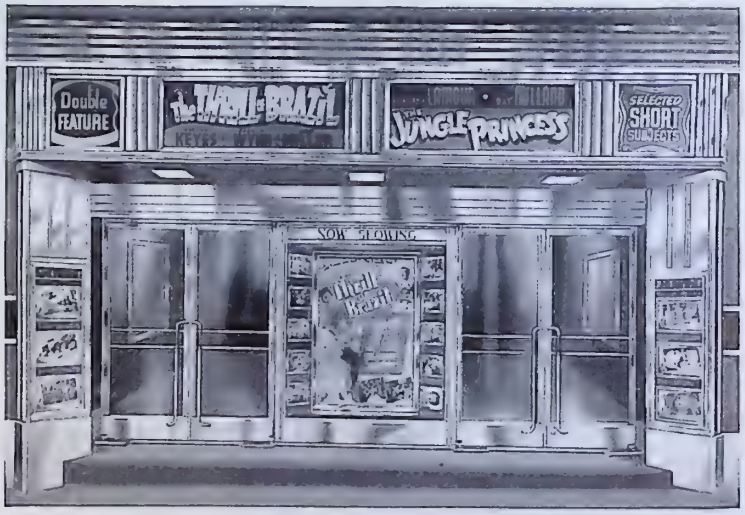
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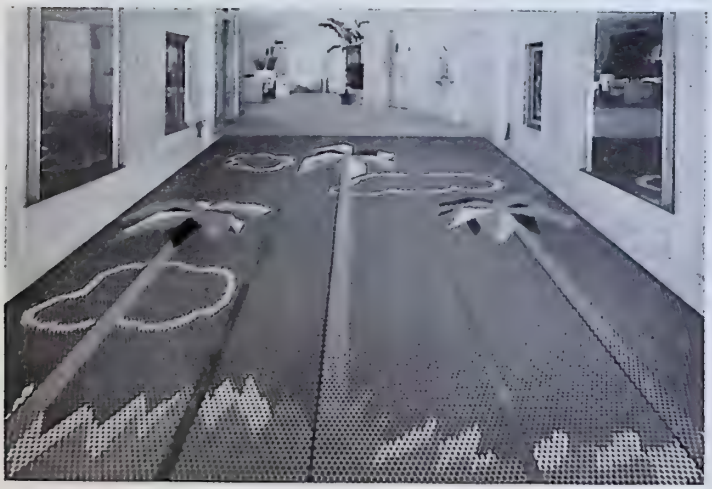
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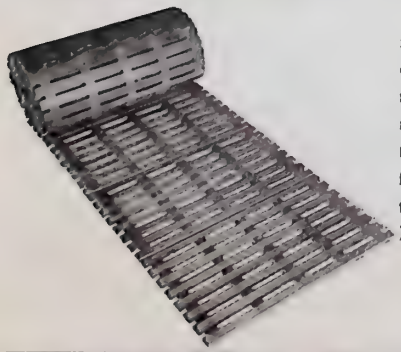


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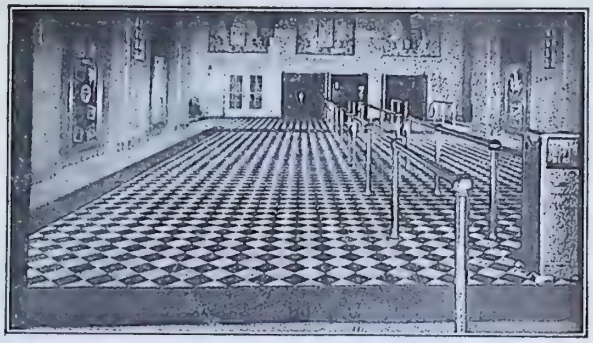
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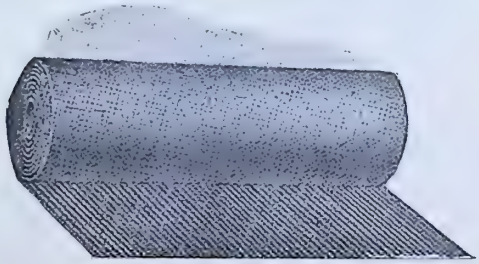
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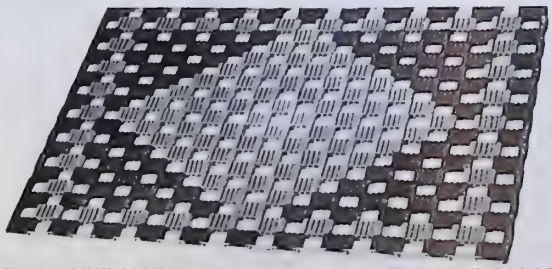
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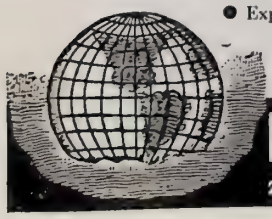
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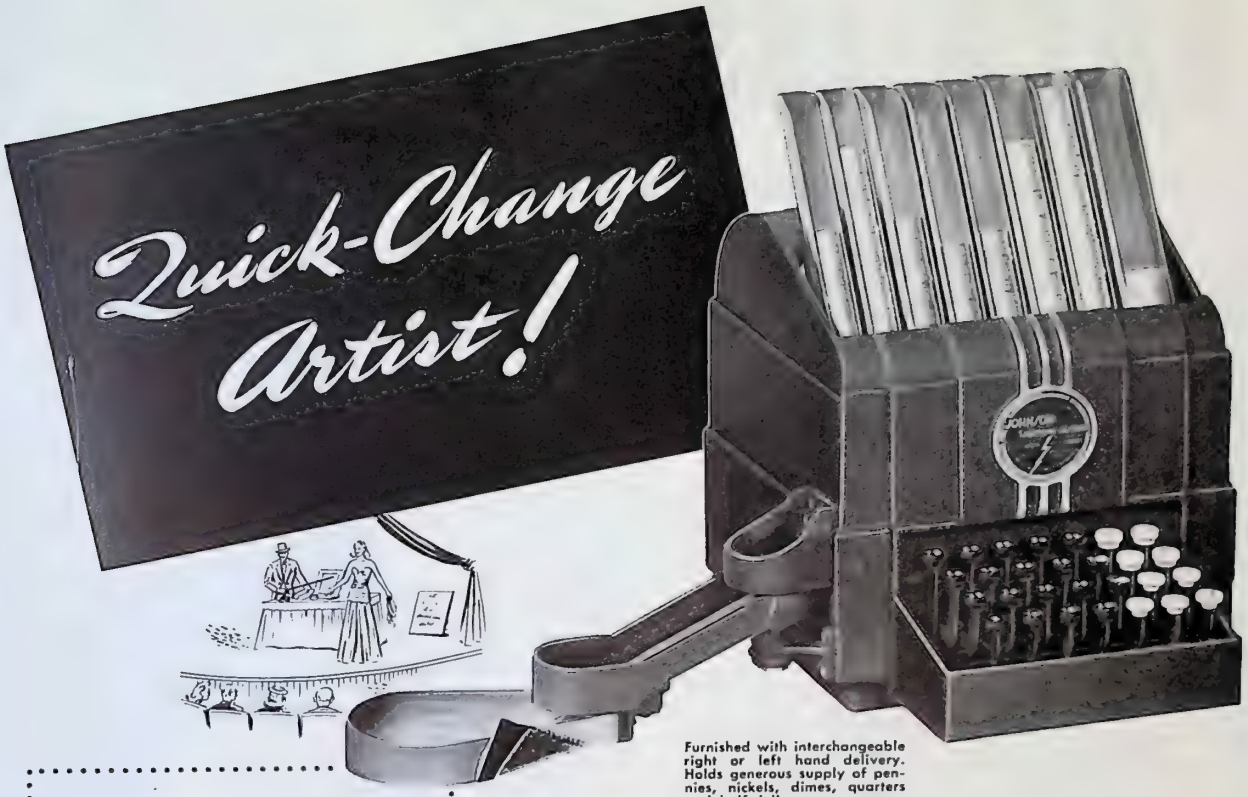
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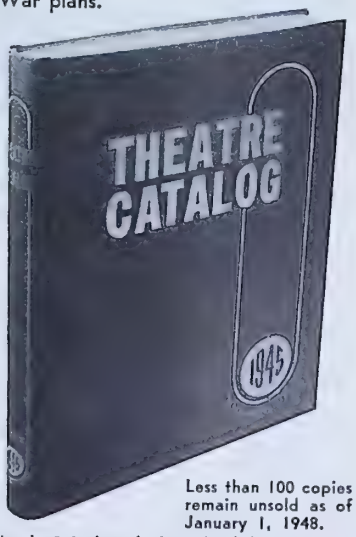
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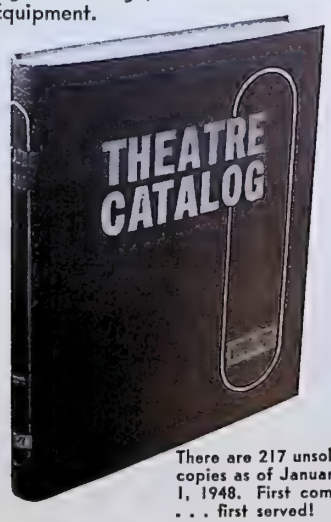


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1947-48

Acoustics and the Audibility of the Show

Assurance of Perfect Hearing Also Includes The Elimination of All Distracting Noises

HAROLD BURRIS-MEYER
and EDWARD C. COLE
Respectively, Stevens Institute of Technology and Yale University

The audience and the showman find it to their mutual advantage and satisfaction for the audience to hear only what it wants to hear, or the showman wants it to hear, and that, clearly. This article* will concern itself with those parts of the theatre building which have a direct bearing on the audibility of the show.

Requirements

The audience wants to hear the actor, the singer, the orchestra, the instrumental soloist, the organ, the audible components of the sound motion picture, and any other sound which is part of the show. It does not want to hear the elevated, auto horns, fire sirens, wind or rain outside the theatre while the show is in progress, or scraping feet in the aisles and rows, rattling foot rests, squeaking seats, banging lobby doors, or whistling fans, roaring blowers, knocking radiators, or telephone bells, buzzers, snap switches, the noisy shifting of scenery, or any unplanned distortion of any sound which is a part of the show.

It is up to the architect to insure perfect audibility of the show, and by the same token to protect the audience against distracting sounds such as those listed above. He must (1) eliminate from the audience area all unwanted sound (noise, that which is not part of the show); and (2) assure audibility for all sound which is part of the show.

NOISE LEVEL

Unwanted sound is noise. Noise in the theatre masks portions of the show and limits subtlety. It is therefore desirable to keep the theatre as free as possible from outside noise, and noise originating inside the theatre.

The average noise level in existing metropolitan theatres with audience present is about 50 db[1]. In the same locations 40 db. is an entirely feasible level involving little, if any, additional construction expense. The best theatres often have a level of about 30 db. The level of ordinary conversation (at 3 feet in open air) is about 65 db.

Sound Transmission

Noise is either airborne or solid-borne. Steel structural members transmit sound with considerable efficiency. Sound thus transmitted becomes airborne when wall, floor, or ceiling areas or fixtures are vibrated by the structural members and act much as the sounding board of a musical instrument.

* "The Audience Hears," originally appearing in the October, 1947, issue of Progressive Architecture, whose assistant editor, Charlotte Masters, has granted special permission to reprint the text and to reproduce from the original art work the illustrations. The article is one of the chapters in a forthcoming book by the present authors on theatre planning, the first such work to derive plan from an analysis of function.

[1] db. means decibel, the handy unit of sound intensity; the log of the ratio of the sound power to a standard reference: 10^{-16} watts per square centimeter.

ISOPHONIC CEILING, designed by Prof. H. L. Cooke, of Princeton University, installed in the Princeton Playhouse (Thomas Stapleton, architect). The flutings ensure that reflected sound will cover the entire audience; added to direct sound from the stage, this produces the same total value at every seat. When ceilings are laid out, they must be planned to reflect the sound back to the audience in such a manner that it will be neither concentrated in certain spots or out of phase with the direct wave. (Photograph courtesy Princeton Alumni Weekly, Margot Cutler, and Princeton University Press.)

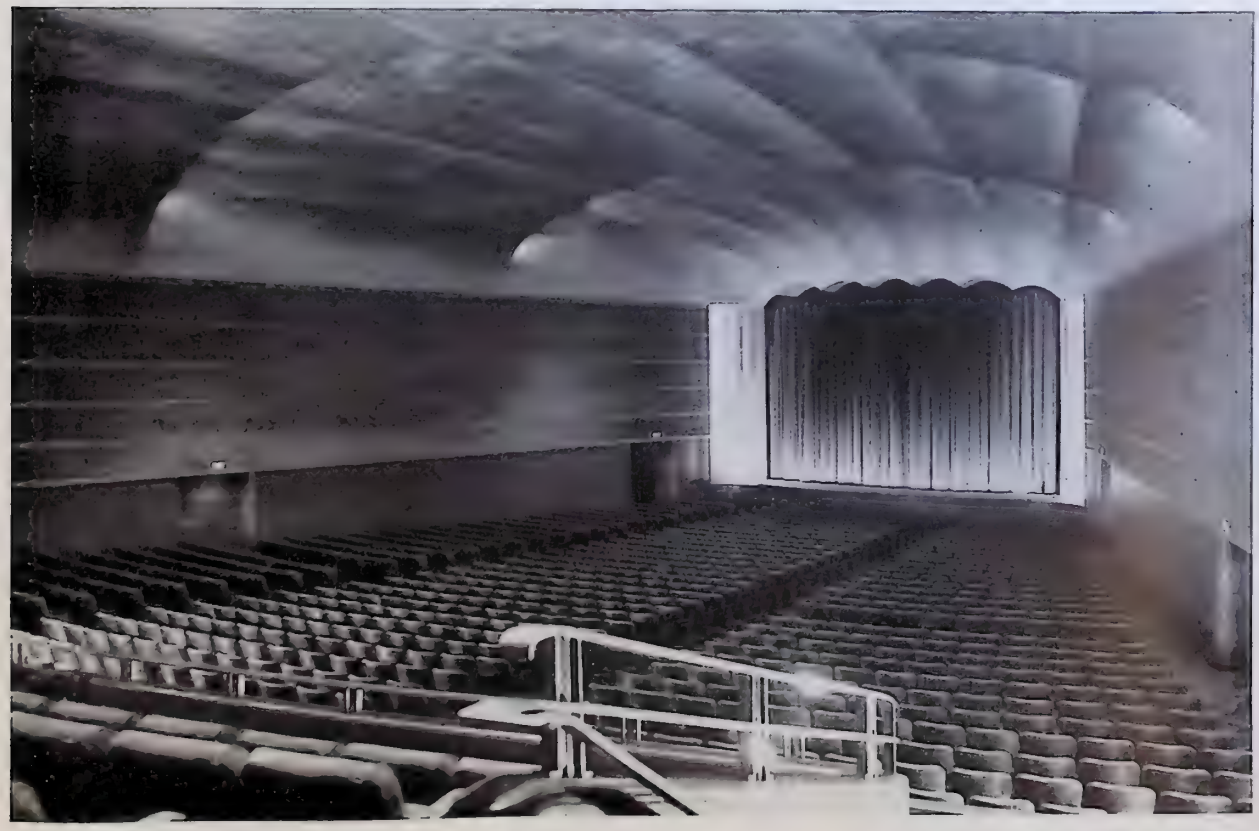


TABLE 1—Airborne noises originating outside the treatre and methods of their exclusion.

Ingress	Method of Exclusion
Doors	Airtight fit. (This is requisite for efficient operation of ventilation system also.) Doors opening on alleys or halls are often less of a problem than if they open on the street. Preferably open only into spaces which can be kept reasonably quiet.
Windows	Do not belong in a theatre. Double where used and not capable of being opened.
Ceiling cuts	Exclude sound from loft by roof insulation, solid catwalks, tight doors.
Projection booth	Quiet machines. Sound absorbent walls and ceiling in booth. Windows in viewing ports.
Ventilation ducts	1. No metal connection between blower and steel structural members. 2. Ducts large enough not to rattle or whistle when blower operates at full speed (above normal operating speed). 3. Sound insulated ducts.

Vibration from sump pumps, blowers, etc., hardly noticeable as noise in the air, becomes noise when structurally transmitted to the house.[2] A concrete slab will usually transmit sound more efficiently than a brick wall.

Procedure

1. List the sources of noise (this will include a noise survey of the site). (See Table 1, Table 2, and Table 3.)

2. List the means of transmission by which such noise might be conveyed to the house.

3. Provide in specifications for elimination of noise at the source wherever possible, for example, maximum allowable noise from machinery, vibration insulating mounts, and so forth.

4. Provide in design for minimum transmission of sound to the house: doors opening on alleys, roof insulation, no single door having direct access from outside to house or stage which must be used during performance, and so forth.

5. Provide in specifications for minimum sound transmission by materials in all places where sound exclusion is a factor: adequate minimum transmission factor by emergency exit doors, interior walls, and so forth.

The specification (5) is arrived at by subtracting the desired house sound level from the level of the maximum outside noise. (30 db. inside level, 90 db. outside level—minimum allowable attenuation by door in frame 60 db.)

Acoustic characteristics of most building materials are known and widely published. Most suppliers of building materials will have sound transmission tests made of their products if they have not been made. Most contractors who install machinery will plan their installation with reference to a maximum noise specification and guarantee to meet such a specification.

Note: All specifications dealing with sound should include a statement of the frequency range to be covered. Acoustic measurements are conventionally made at octave intervals from 128 to 4096 cycles per second. A 60-cycle hum can be most annoying, as can a 10,000 cycle squeal. The ear responds to frequencies from 16 to 16,000 cycles per second, and a subway rumble is felt at even lower frequencies. For building material specifications and noise level calculations then, materials must often be tested for transmission of higher and lower frequencies than has been conventional practice.

[2] Auditorium exclusive of stage.

TO HEAR THE SHOW

Sight lines are apparent on blueprints. Anyone can take a ruler and see from the architect's designs whether or not it will be possible for the audience to see the show, and presumably anyone who builds a theatre will make a reasonably thorough sight-line analysis of the designs before approving them. No matter how much faith he has in his architect, he seldom cares to overlook any chances of error when he has a large investment to protect.

Blueprints per se will not, on the other hand, show whether or not the audience will be able to hear. Much of the data from which acoustic analyses are made are to be found in specifications for wall and ceiling surfaces, equipment, etc. The apparatus and engineering data for finding out from plans and specifications whether the theatre is acoustically good or not are not ready to the hand of the layman.

Approaches

Acoustic studies must be conducted coincidentally with the design if the design is to avoid the risk of considerable alteration, but this logical procedure is still lamentably far from common practice. The science of architectural acoustics is new. Architects generally have not been trained in it; in fact where acoustics are concerned, a curious obtuseness often prevails.

Though this situation shows some signs of improving, most existing and new theatres suffer from one of the four common architectural approaches to the problem of making it possible for the audience to hear, each of them successful in getting a good theatre about once in a thousand tries.

The first is to trust to luck: after all, the Metropolitan Opera House was built on that plan. No one has hit the jackpot since, however.

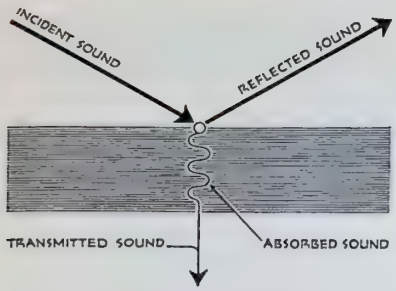
The second is to use a rule of thumb; it varies with what rule and whose thumb, but a few people, with much experience in theatre building, have learned perforce a little about acoustic

TABLE 3—Solid-borne noises and methods of their prevention.

Source	Method of Prevention
Snoring	Put on a good show.
Train rumble (subway, elevated, surface)	Only satisfactory solution is to float floor and ceiling supports and, in case of excessive vibration, interior walls, as in radio broadcast studio design.
Vibration from non-theatre functions of building (gymnasium, bowling alley)	See above, or float the floor of the facility at which the vibration originates.
Motors, Machinery	Floating mounts.
Switches Plumbing	Use mercury switches. More than one wall between house and facility. Isolate from structural members.

TABLE 2—Airborne noises originating in the theatre and methods of their prevention.

Source	Method of Prevention	Source	Method of Prevention
Radiators	Heat the house entirely by circulated air, or wall or floor radiation. On stage, 1. Radiator return line graded to avoid condensate and resultant banging. No valves to hiss. 2. Circulate hot water rather than steam.	Audience (Talk, shuffling)	1. Make rear crossover as sound absorbent as possible. 2. Lobby doors opposite aisles used for exit, not during show. 3. Divide rear crossover from house by a wall—a glass wall for motion picture houses. (This eliminates the standee rail). 4. Carpet. 5. Silent seats.
Stage Wagons Discs (Noise magnified because of revereberant stage floor)	1. Well made ball or roller bearing casters running on level tracks installed over stage floor. 2. Revolving stage on its own support structure (quieter than disc on stage floor). 3. Elevators are quiet unless they are of the screw jack type and run too fast.	Orchestra pit	Rubber feet on chair legs and stands.
		Telephones	Locate only where one open door will not permit sound to reach house or stage. Light instead of bell on stage.



ACTION OF SOUND on encountering a solid medium; in addition to being partially reflected, absorbed, or transmitted, sound is also refracted (changed in direction) by the more dense medium.

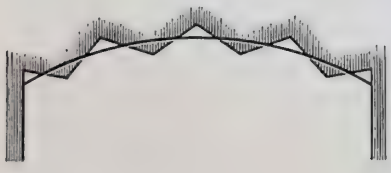
phenomena, and have used that knowledge, more often to explain why the theatre was not good than successfully to make it satisfactory. Most present theatres were built by some rule of somebody's thumb.

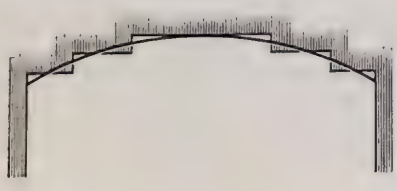
Knowing that theatres usually turn out bad acoustically, there is a third architectural approach to the problem: build it first and fix it later. This means padding the walls or hanging up a drapery to stop an echo. No acoustically good theatres have resulted from this approach.

The final architectural triumph, however, is supposed to banish the demon of bad acoustics. It is born of despair and the public address system. If all surfaces in a theatre are made very soft and sound absorbent, the audience can hear practically nothing. There are no echoes. Then, if a powerful public address system is installed, powerful enough to frighten children blocks away, the audience can hear everything, including (and this causes much bewilderment) the echoes supposedly banished by the padding. Some of the largest theatres in America were thus designed. In them a strong human voice unamplified can hardly be heard a hundred feet. It takes much amplification to make a mighty pipe organ audible. And in some thousands of seats, everything the audiences do hear, they hear twice.

Oddly enough, a number of acoustically bad theatres were built wrong not because of any of the architectural approaches mentioned, but as a result of a sincere and outwardly intelligent effort to make them good. The miscalculations have come about through: (1) making an auditorium which is acoustically good while the asbestos is down, but bad when the play is on, through lack of provision for acoustic characteristics of stage, flyloft, and scenery; (2) assuming that the seats will all be occupied all the time (in two existing theatres acoustic conditions are fair when the house is full, bad when it is half empty, and it is impossible to rehearse in the empty theatre with the curtain up); (3) assuming that building materials with the word "acoustic" in their names will contribute to good acoustics no matter where or how used.

TWO METHODS of breaking up a curved rear wall of an auditorium to avoid focused sound reflections are shown here. (Drawings through courtesy Hale J. Sabine and Celotex Corporation.)





The theatre offers an acoustic problem replete with complexities which arise out of the nature of the show and the habits of the audience. The architect and the engineer must work under a severe handicap unless they know show business.

The architect who knows show business well enough to design a theatre will often feel competent to prepare plans and specifications which will result in adequate exclusion and elimination of noise. The more specialized task of getting the sound of the show to the audience usually calls for the services of a physicist or engineer trained in acoustics to undertake the requisite calculations and tests.

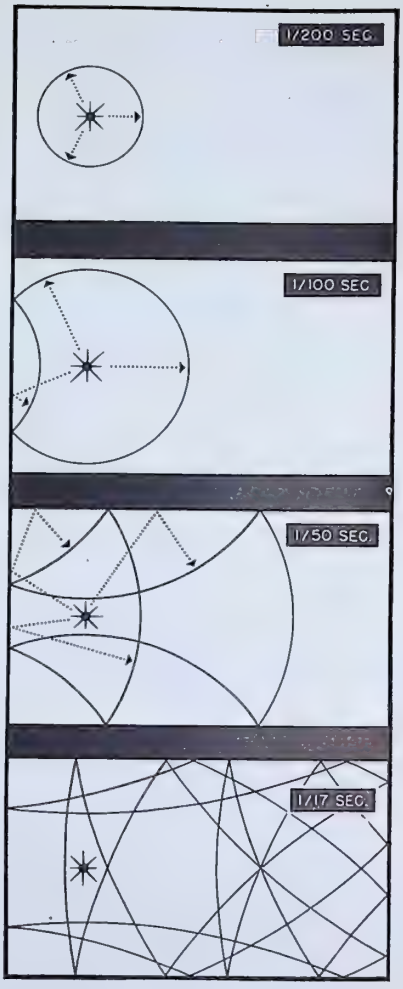
Action of Sound

In the theatre useful sound emanates from actors, orchestral instruments, organ, and loudspeakers; located on the stage, in the pit, and above and at the sides of the proscenium. The architect's job is to get it to the paying customers no matter where they sit without distortion or appreciable loss of intensity. Getting the sound to all the customers is a problem of distribution. Getting it there at almost equal intensity everywhere and having it die away rapidly at a predetermined interval after it has ceased to emanate from the source, so as not to interfere with the next sound as it comes along, is a problem to be solved by achieving a certain reverberation time.

Part of the sound pressure wave goes straight from the source to auditor. Part of it is reflected from ceiling and walls. Part of it gets to the auditor after it has been reflected back and forth about the house many times. Part of it has been for a trip around the stage, or has been reflected from the scenery or cyclorama.

Distribution

Ceilings are the principal distribution surfaces. When ceilings are laid out, they must be planned to reflect the sound back to the audience, either directly or via walls, but in such a manner that it will neither be concentrated in certain spots, nor reflect back and forth between parallel surfaces, nor get to the audience out of phase with the direct wave. Moreover, since sound travels only about 1150 feet per second in air, the length of the path of the first reflected wave must not exceed that



MULTIPLE REFLECTIONS of a single sound wave front in a closed room are shown here, at 1/200, 1/100, 1/50, and 1/17 second. (Drawings courtesy of Hale J. Sabine and the Celotex Corporation.)

of the direct wave by more than 50 feet (preferably less) or the audience will hear everything twice.

The position of the side walls is determined by sight lines. The depth of the house (curtain to back wall) is governed by visibility requisites. Sound distribution requirements govern the shapes of the side walls, ceiling, ceiling under the balcony, and rear wall.

The fact that the angle of reflection of a sound wave is equal to the angle of incidence (neglecting diffraction phenomena at low frequencies) makes it possible to lay out tentative shapes on paper. But since even the most unorthodox appearing shapes sometimes result in good theatres and vice versa, tests are necessary to establish the workability of any design.

Plan and section of the theatre may be tested for distribution in ripple tanks, three-dimensional models by spark photographs and by tracing reflections of a small beam of light. The technique of testing is fairly complex. It can only be pointed out here that rough approximations are possible with single gravity

waves in water and mercury tanks and that, within some limitations, varying frequencies may be studied stroboscopically with capillary waves.

Photographs and visual observation reveal (1) desirable distribution; (2) undesirable standing waves (repeated reflections between two surfaces); (3) echoes (a number of reflected waves whose path of travel is long coming to the audience, or part of it, in phase); (4) dead spots, into which very little sound penetrates (as is sometimes the case under balconies or where direct and reflected waves arrive out of phase and cancel out); (5) focal points (such as the concentration of reflected waves on a small area of seats from a ceiling vault). When the wave pattern is rapidly broken up, and waves from all directions, of approximately equal size, cover the audience area, the distribution is probably satisfactory.

Spark photographs (actual pictures of the sound waves in air) have the advantage of greater clarity than most ripple tank pictures and are useful in the study of diffraction phenomena, and precise location of sources of trouble.

A small beam of light, reflected from surface to surface in a model, makes it possible to trace with reasonable exactness the path of the center of a sound wave.

There are pitfalls to be avoided when sound distribution tests of architectural shapes are made:

(1) Sound sources are at numerous locations and tests must be repeated for from 6 to 12 locations on the stage with various curtain trims as well as for all sound sources other than the stage.

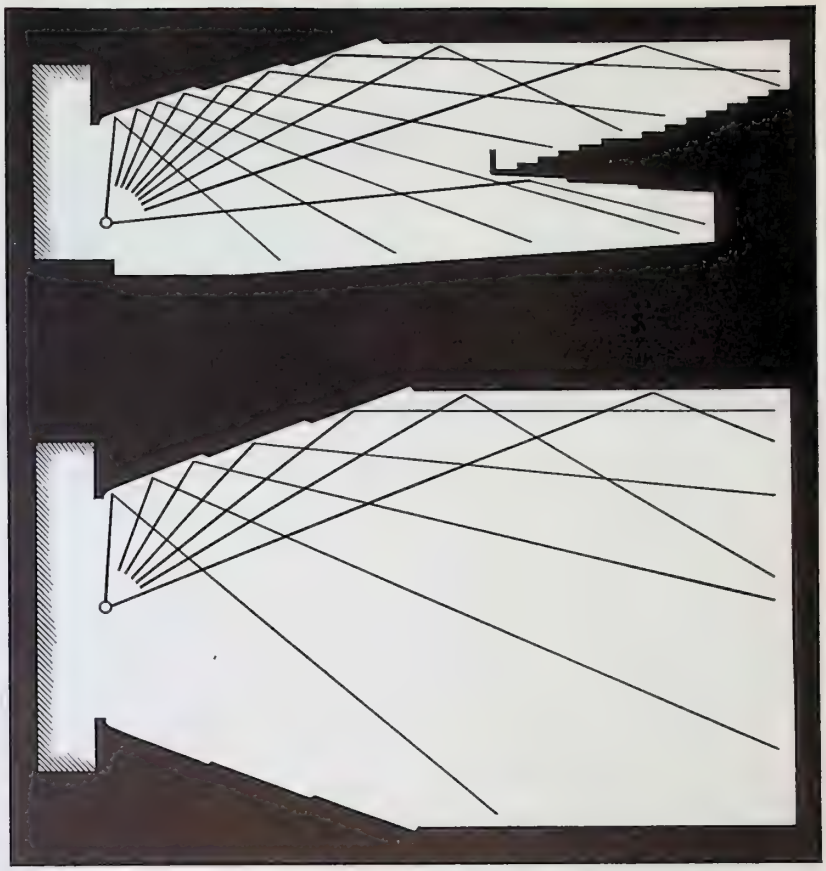
(2) Absorbent surfaces must be made non-reflecting (open or beached) in the model.

(3) Stage and house must be tested together. They constitute a pair of coupled rooms. Plaster cycloramas must be designed as part of the acoustical planning of the house and tested with the house model. (A cyclorama can be tipped toward the back of the stage far enough to put its focal point out of harm's way. Thus rigged it is also easier to light than if it is vertical.)

(4) Chandeliers, ceiling cuts for lights, and ventilation ducts must be included.

(5) If reverberation calculations show any absorbent wall material to be desirable, its location must be determined by test so as not to intefere with sound distribution.

Finally, a ceiling under a balcony sloped up toward the back of the house, or a back wall which follows the curve of the seats, will almost invariably render good hearing impossible in at least part of the theatre.



MAXIMUM REINFORCEMENT of direct sound is indicated by the section (above) and the floor plan of an auditorium. (Stage area at left is incomplete.) With splays properly placed, the entire auditorium can receive reinforced sound. (These and the other drawings credited to the Celotex Corporation are reproduced from "Less Noise—Better Hearing," by Hale J. Sabine, and published by the company.)

Reverberation

Reverberation is easy to calculate. But what reverberation is desired is another thing. The scale of desirable reverberation times runs from long for Widor's "Toccata" on the organ (it was composed to be played on the organ in Saint Sulpice which is highly reverberant), to short for speech, which requires a high percentage of definition. In legitimate production, reverberation will vary from scene to scene depending upon the settings.

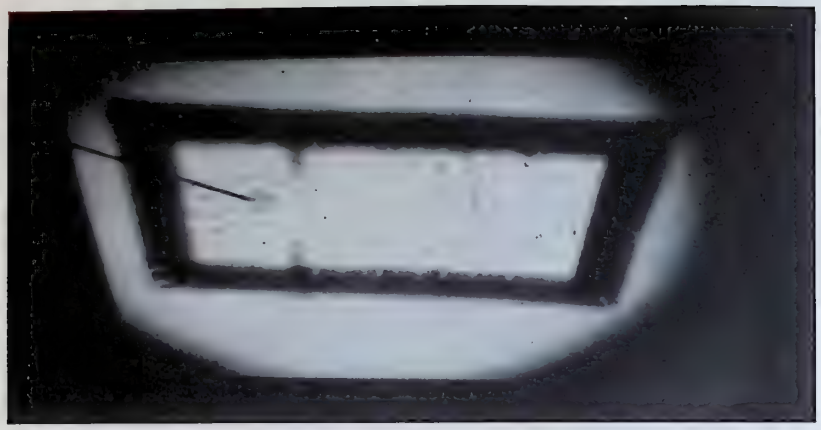
The ideal theatre will have provision for controlling reverberation. At least one attempt to do this has been made, using wall panels which can be changed, but an analysis of the results is not at hand. Unless some means of controlling reverberation is provided, the best that can be achieved is a compromise between the optimum times for the various types of productions.

Reverberation optima have been the subject of much investigation. Recent studies directed toward the determination of optimum reverberation time for various house volumes show slightly longer times than those considered optimum five years ago. Moreover, as clients demand more and more precise acoustic conditions, optimum reverberation times tend to increase slightly. In a theatre planned for more than one type of production, if means are not provided for reverberation control, it is well to choose a reverberation time which is an average between optima for speech and orchestral music. The better the first reflections are controlled the closer orchestral optima should be approached.

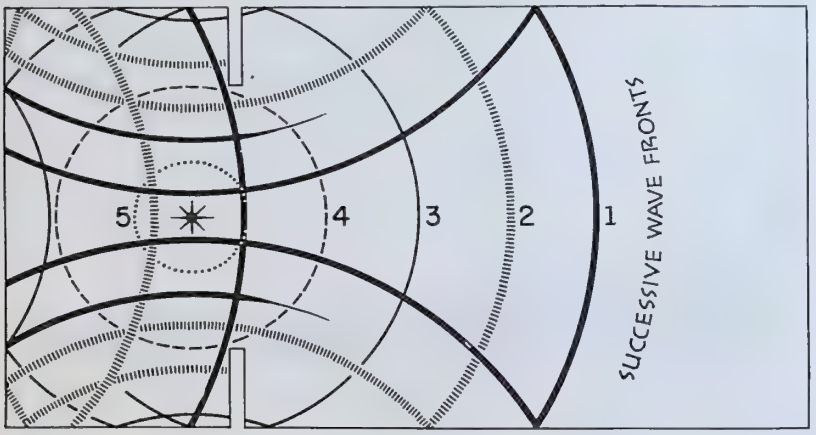
For the calculations, the house and the part of the stage, enclosed in a box set are considered. Tolerances, if any, are best taken on the long side. This is done for two reasons: (1) tolerance involves a margin of error. If the house is too dead, its correction is costly; if it is too live, correction is usually simple and cheap; (2) in calculation of reverberation time no account is taken of the stage house outside the set. The stage house has, however, some effect on the reverberation: when plein-air sets are used, the effective volume is greater than with a box set. In hung shows in which the flies are full, there is more absorption than with a box set. Both these conditions in practice call for slightly longer reverberation than would be requisite in the house with the proscenium closed.

Optimum reverberation time, it must be noted, varies with frequency. In large houses (over 200,000 cu. ft.) a slightly longer reverberation in the low frequencies than in the highs is generally considered requisite. Recent investigations seem to indicate the desirability of reverberation times more nearly equal throughout the audible range than was standard some years ago. If the reverberation time is made equal throughout the audible frequency range, the sound absorption characteristics of the audience will slightly unbalance it in favor of the lows.

Unfortunately the theatre does not play to the same sized audience at every performance. And the most neglected feature of acoustic planning is the provision of means of compensation for audiences of varying size. Yet it is possible to have the reverberation time the same with no one present as with a



THE RIPPLE TANK TEST indicates to the trained physicist or acoustic engineer the acoustic properties of a specific theatre shape. Above is an actual photograph of a ripple tank test of a stage-auditorium model (see explanation in the text); and below is a diagrammatic representation of multiple sound reflections in a horizontal plane as revealed by the ripple. The architect needs the specialist's help.



capacity house.

Each person in the audience absorbs a certain amount of sound. The unit of absorption is the sabine. If the acoustic specifications for the seats are so drawn that each seat empty absorbs as many sabines at the same frequencies as the seat plus a person sitting in it, the total absorption (and therefore the reverberation time) will be unchanged whatever the size of the audience. Seats and audience are therefore used to keep the reverberation time the same though the audience may vary in size. Before drawing seat specifications it is necessary to look into the question of what kind of people will constitute the audience and how they will dress. An audience of children will have fewer sabines than a matinee audience of women shoppers. Stiff shirts and bare shoulders are reflective as compared to soft shirts and afternoon dresses, a phenomenon which makes the traditional first night audience, at least acoustically, live.

When more absorption than that furnished by the seats or audience is necessary, it is well to get it next from carpet (which serves to eliminate the distraction of noise emanating from the audience), next from decorative hangings which can be changed in position and size, and last from permanent absorbent wall surface materials located so as not to interfere with sound distribution.

SUMMARY

The architect determines his house size from the necessary number of seats; its wall splay and depth from the requirements of good seeing; ceiling shapes from sound distribution and front stage lighting requirements; back wall and plaster cyclorama shapes by the necessity of preventing echoes and focal points. When model tests confirm the correctness of this much of the design, he may proceed.

His structure is conditioned by the necessity of avoiding resonance (it is generally believed that the organ caused the collapse of the roof in one theatre).

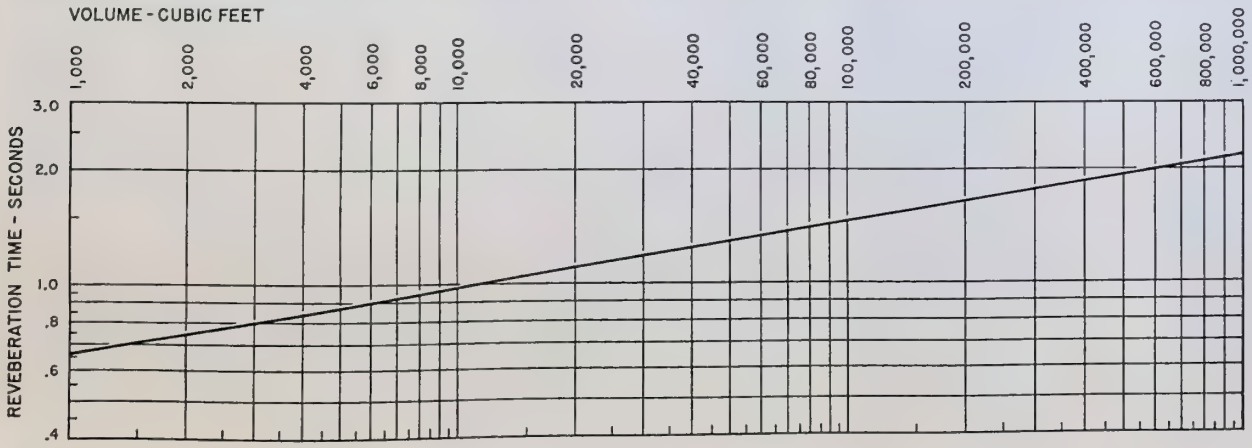
His wall surface and heat insulating materials he specifies to give him: (1) the correct total reverberation time; (2) absorption where and to the extent he needs it.

His ceiling he generally keeps as highly reflective as possible to insure undiminished sound distribution.

He specifies seats which provide the same amount of absorption empty as do seat and occupant together when they are occupied. He insulates the theatre against outside noise and prevents inside noise.

One can count on the fingers of one hand the theatres in which all these requirements have been scrupulously met. No theatre in which an honest attempt is not made to meet them is worth building.

OPTIMUM REVERBERATION TIME, with aetists in place, is shown as a function of studio size. (The curve was developed originally for radio studios, but it is also adaptable to other types of auditorium.) Compensation for values within 30 percent of those indicated can be made by microphone placement. Further compensations must be effected through acoustic design and treatment. (Drawing from an article by J. P. Maxfield in the Oscillator—copyright 1947 by Western Electric Company, Inc.—and used through the courtesy of R. V. Fingerhut and copyright holder.)



Hints on Achieving Good Acoustic Results

A Review of Sound and Acoustic Principles; Properties, Uses, Maintenance of Materials

ALLEN WILSON
Acoustical Department, The Celotex Corporation

Despite the facts that "talking pictures" are now twenty years old and that most of the theatre-going public has practically forgotten the "silent screen," the problem of providing an acoustically good house for exhibiting modern motion pictures is a constantly recurring one. In view of the fact that the science of architectural acoustics was well advanced long before the talkies were even considered as a practical possibility, it appears—although a bit uncomplimentary—that exhibitors generally have neglected to become informed on one of the most important factors in giving their patrons satisfactory presentations, namely, good hearing conditions.

There is no mystery in providing good theatre acoustics. This applies whether the thought begins in the blueprint stage, whether the house is now in operation, or whether an old store building is being remodeled to become a theatre. Most theatre acoustical problems arise from oversight, lack of recognition, or an attempt to short-cut a reliable acoustical correction job. There is trouble ahead in either case.

The best equipment will not overcome an unfavorable acoustical condition, nor will perfect acoustics mold a high-fidelity presentation out of sound generated by faulty equipment. Irrespective of the equipment used, unless the customers can hear what comes out of the speakers with some semblance of its original quality and clarity, the presentation is bound to be unsatisfactory. And, what happens to sound after it leaves the speakers is wholly dependent upon the acoustical conditions in the house.

REVERBERATION

While in some instances shape and design of a theatre have a bearing on the resulting acoustical condition, in all instances the major factor is reverberation. An overly reverberant house will scramble words and music, and will be noisy. A house with too little reverberation will be dead. Between the two evils, perhaps the dead house is to be preferred in that extra power can be applied to carry words and music to the listeners. While the quality will, of course, be poor, the sound will be distinct. No amount of power can overcome excessive reverberation. Additional power will only aggravate the condition and increase the noisiness of the presentation.

In the average house, the solution lies simply in providing a proper reverberation time for the size of the house. Distribution of sound must, of course, be considered, but in the main this presents no serious problem. Modern, highly directional sound equipment will put the sound where you want it, providing it has a chance to get there, as you want it.

Reverberation is the term used to denote the tendency of a room to keep a sound alive and audible after the original sound source is cut off. Reverberation time means the time in seconds that sound is prolonged from the instant of cut-off. For acoustical purposes, this is a definite measure of the time it takes for a sound to drop to one-millionth of its original intensity. All architectural acoustical data is based on this measure.

SOUND ABSORPTION

Sound is energy. Every sound wave that leaves the speakers has a definite amount of acoustic power in it. Until enough of that power is used up, or dissipated, to lower the energy below the threshold of hearing, it is an audible

ACOUSTICAL TREATMENT in the auditorium of the Riviera Theatre, Saint Paul, Minnesota, is applied on approximately two-thirds of the side walls. The rear wall, however, is fully treated. The material throughout is Acousti-Celotex. The mechanically made openings permit the sound waves to reach the absorbing back and are of such size that painting with ordinary mixtures and methods does not close them up. When Acousti-Celotex is finished with an oil-base paint or other washable finish, it can be cleaned by any method the manufacturer says is suitable to the finish.



wave. The dissipation of this energy is referred to as absorption.

A sound wave once started in the theatre will continue to travel around the room until it is completely absorbed. Practically all of this absorption results from the contact of the wave with the walls, ceiling, floor, seats, patrons, or other obstructions. The distance traveled within the room is so short, friction within the air accounts for so little it can be ignored. How long the sound exists and travels depends upon the amount of energy that is extracted from it with each contact.

In the case of hard, dense surfaces, such as plaster walls, 3 per cent or less of the energy is absorbed at each contact. The wave travels at approximately 1,120 feet a second, so it is readily seen that hundreds of contacts are required to absorb that wave. In the meantime, the wave is bouncing around from wall to wall, floor to ceiling; and as it travels back and forth throughout the room, the ear hears it as one prolonged sound. A sound wave is reflected from a hard, impenetrable surface just as a light wave is reflected from a mirror. In fact, a hard wall is a more efficient reflector of sound than are most mirrors of light.

A certain amount of reflection is desirable. A once or twice-reflected wave will reinforce the original wave. It is this reinforcement that gives liveness to indoor sound. In establishing a desirable reverberation time, adequate absorption is placed in the room to kill quickly all but these wanted once or twice-reflected waves.

The absorption capacities of all common building materials and of practically all theatre furnishings are known, consequently it is relatively simple to calculate, by established formula, the amount of absorption necessary in each house.

If absorption alone were the only problem involved in setting up good acoustical conditions, an array of mattresses, bed blankets and old burlap bags could probably do a fairly good job. However, these would hardly enhance the appearance of the theatre, and the cleaning bills would be a mite high.

In selecting acoustical materials, the theatre owner must take into consideration a number of factors in addition to absorption coefficients, or capacities. Will the acoustical effect be permanent? Can the material be decorated and redecorated as necessary? Are maintenance costs excessive? Can the material be readily cleaned?

Acoustical materials depend largely upon their porosity for their sound-absorbing ability. Such a material will absorb sound so long as a sound wave can enter the porous body of the material. It is obvious that the wave must have access through the surface. If the surface is closed tightly with a film of paint or clogged with dirt, then, of course, the porous back or body is no longer effective. The sound is reflected from the closed surface just as readily as it is from the surface of a hard material.

The first acoustical material that could be painted with ordinary paints in an ordinary manner—with brush or spray—and as often as necessary without loss of efficiency, was the familiar Acousti-Celotex, introduced more than twenty years ago. This material established the basic principle for all paintable acoustical materials. It has a hard, smooth surface through which perforations are drilled. These mechanically made openings permit the sound waves to reach the absorbing back, and are of such size that painting with ordinary mixtures or methods does not close them up.

Like any wall or ceiling surface, when Acousti-Celotex is finished with an oil base paint or other washable finish, it can be cleaned by any method suitable to that finish.

DISAPPOINTING SUBSTITUTES

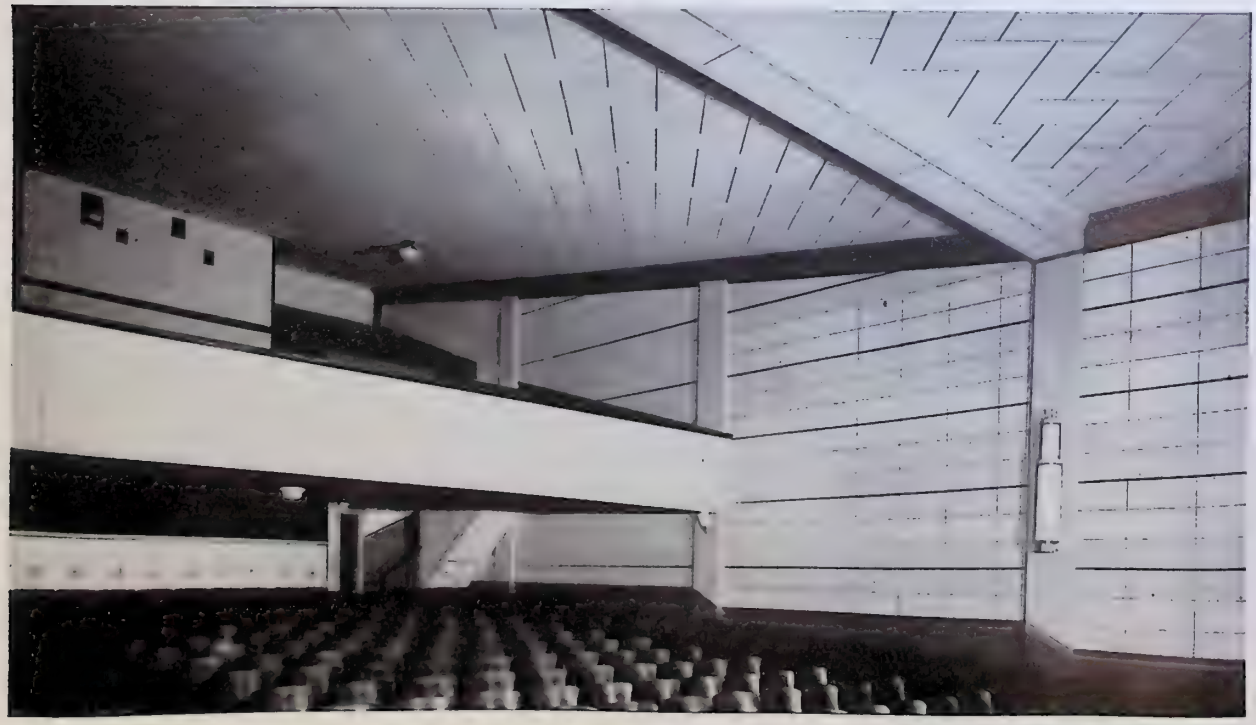
Time has conclusively proved that there are no satisfactory substitutes for a fully paintable acoustical material. In the early days of talking pictures, many exhibitors attempted to correct acoustical conditions in their houses by using ordinary fibre building board, which in its natural, unpainted finish did have a high degree of sound absorption, as compared with plaster walls and tin ceilings. Where enough of this material could be installed, it did add enough absorption to effect some improvement.

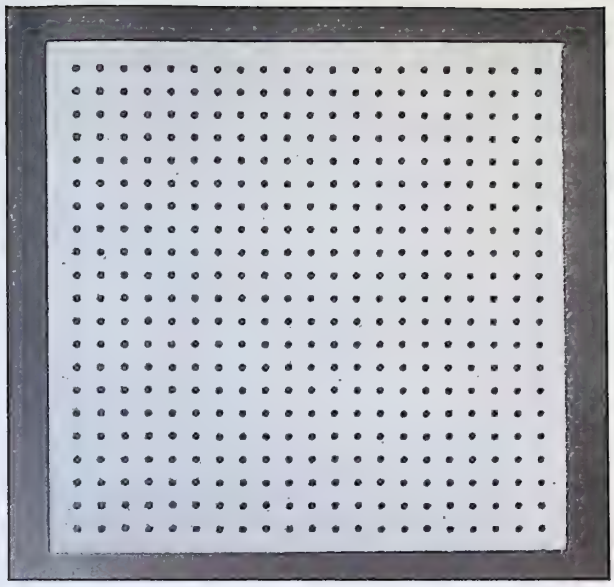
Eventually, this material became soiled and dirty. When it was painted, these houses were back to their original conditions. The only available relief then was to install a bona fide acoustical material over the old interior finish.

While some types of materials, which depend upon their natural surface porosity for their absorption, can be painted within narrow limits, with certain types of paint properly applied (provided the pores are not filled with dirt particles), in most instances much, if not all of the absorption is lost when paint is applied.

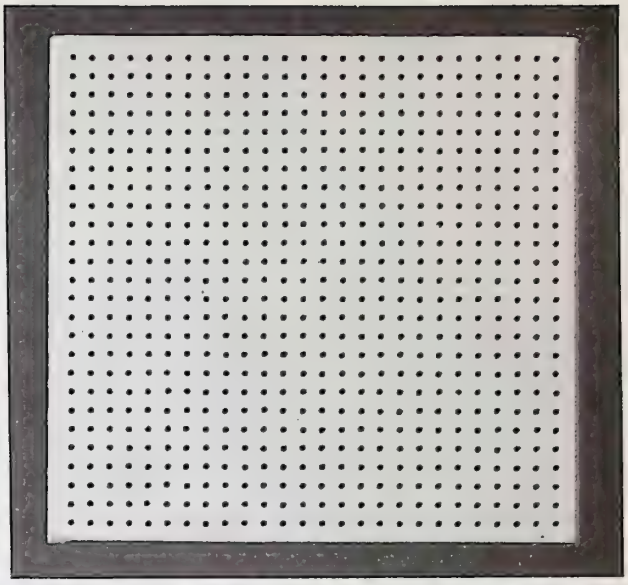
About the only safe way to clean these

THE ACOUSTICAL TILE along the side walls of the auditorium of the Senatobia Theatre, Senatobia, Mississippi, is Acousti-Celotex, but on the ceiling is plain interior finish tile. A certain amount of sound reflection is desirable. A once- or twice-reflected wave will reinforce the original wave. It is this reinforcement that gives liveness to indoor sound. In establishing a desirable reverberation time, adequate absorption is placed in the room to kill quickly all but these wanted once- or twice-reflected waves. The maintenance costs on Acousti-Celotex are considered to be low.





ACOUSTI-CELOTEX CANE FIBER TILE absorbs sound through the drilled perforations, which are of such size that it is not commonly possible for paint to bridge them. And painting does not cause this type of tile to lose its high sound-absorbing efficiency. Effective designs can be made.



ACOUSTI-CELOTEX MINERAL FIBER TILE is an incombustible, perforated acoustical material which also can be repeatedly painted without loss of effectiveness. The first Acousti-Celotex was introduced more than twenty years ago as the first acoustic material that could be safely painted.

board surfaces is with a brush and a vacuum cleaner. This will remove some of the dirt and will brighten up the surface somewhat. However, the discoloration, unavoidable with age, will make an eventual paint job necessary. When that time comes, the only wise course is to plan a complete redecorating job and a permanent acoustical correction with a paintable acoustical material.

As to the amount and placement of the acoustical material you select, obtain the advice of an experienced acoustical technician and follow his recommendations. No experienced acoustical technician will put too much material in your theatre, and he will avoid undertreatment, which surely will result in an unsatisfactory job.

While many theatres have been treated by placing the acoustical material on the ceiling and back wall, a more satisfactory result can be obtained in most instances by distributing the material along the side walls and the back wall. Back wall treatment is absolutely essential in theatres 55 feet long and over. Unless sound is absorbed effectively, the reflection from the back wall will reach the front of the seating area as a distinct echo. Sidewall treatment will prevent flutter, or cross reflections, and should be so distributed that no large reflecting surfaces are directly opposite each other. The treated area should extend from the back wall to a point about two-thirds, or three-quarters, of the distance from the back wall to the proscenium arch.

The audience and seats (particularly if upholstered) provide a highly absorptive surface opposite the ceiling, which being left reflective, reinforces the original sound by directing the "spill-over" from the speakers back into the audience.

To prevent trouble from back slap from the front wall, it is usually advantageous to place an absorbent covering approximately the size of the screen opening over the wall directly back of the screen. Almost any effective sound-absorbing material can be used here. It should, of course, be a dark color to prevent light reflection.

Crowd noise from the foyer and lobby can be kept from disturbing the auditorium audience by adequate treatment in those areas. Attention to this problem has become highly important since popularity of the candy bar has made it a feature in many theatres.

There is no way to prevent crowd noise at the candy bar. The only remedy is to kill it as effectively as possible, and to prevent it from spreading into the auditorium. Acoustical treatment on the ceiling in the foyer and lobby will minimize the disturbance caused by talking and laughing — and by the younger patrons of the theatre.

STANDARD MUFFLETONE is an acoustical tile which absorbs sound through the natural porous surface. If the surface pores are sealed with paint, sound waves can no longer enter the absorbent body. As to the amount and placement of acoustical material, advice should be obtained from a competent acoustic technician; he will neither overtreat nor undertreat the theatre, but give the best possible results.



Piping Light with the Acrylic Plastics

"Painting with Light" and "Radiant Walls" Are Effective Ideas for Novel Decoration

HENRY PEARSON
Rohm and Haas Company

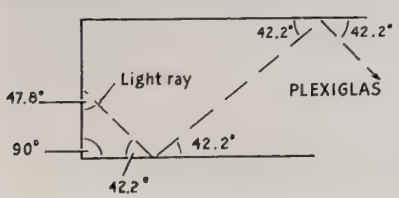
It has long been known that colorless transparent materials such as optical glass or fused quartz will carry light from one point to another—even around corners and curves—but until the development of the acrylic plastics, applications for this light-piping effect were strictly limited. Residual color in ordinary glass absorbs much of the light if the path of travel exceeds a few inches, and the special types of glass and other colorless materials are restricted by cost or other factors to a few special applications.

These restrictions to light-piping are removed by the acrylic plastics. Being colorless and crystal-clear, they show almost no absorption of the light passing through them; since they are thermoplastic, they can be shaped readily into any desired form, and they are, in addition, easy to machine. Finally, they are reasonable in price.

By means of an acrylic bar or rod, light may be piped to illuminate an area at a considerable distance from the source of light. Acrylic dials may be made visible by light piped from concealed bulbs; signs are spotlighted by mysterious light pouring out of the end of a transparent rod; photo-electric cells to perform all sorts of operations may be activated by light piped in a similar manner. Medical instruments of many special types use light piped through acrylic rods to give illumination, at the exact spot where it is needed, free from the heat of the bulb.

A special application of light-piping is the effect known as edge-lighting. The distinguishing characteristic of edge-lighting is that the light introduced into the edge of the sheet is caused to leave the sheet at spots along the surface as desired by the designer. The sheet at these points, therefore, appears to glow. The effect can be accomplished in a number of ways, but the fundamental requirement is that the high polish on the surface of the sheet be removed or coated over. It may be sanded, engraved, scribed, etched, painted or treated in any other way that serves to disturb or cover the surface luster. A film of oil or grease—even a layer of water on the sheet surface will change the behavior of the light rays at the surface of the plastic and allow some to escape.

FIGURE 3—If the sides of the piece of plastic are parallel, reflected light rebounds from one surface to another, advancing lengthwise through the medium but remaining entirely within it.



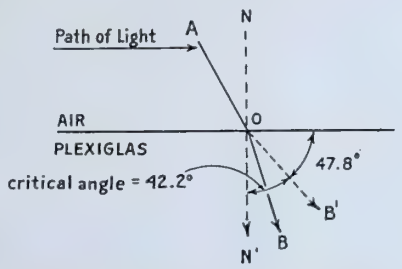


FIGURE 1—Light, passing from one material to another, at other than a right angle, is refracted (AOB). As the angle of incident ray increases, that of refraction also correspondingly increases.

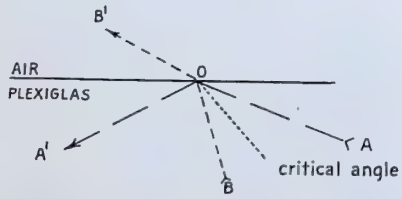


FIGURE 2—Light ray in the plastic that hits the outer surface at an angle of more than 42.4 degrees (AOA') cannot escape. Because the angle of incidence is less than 42.2 degrees, ray BOB' does.

PRINCIPLES OF LIGHT BEHAVIOR

Many of the new and unusual applications for the acrylic plastic, Plexiglas, as a means of transmitting light were worked out in the Product Design laboratory of our company. An adequate explanation of the reasons for these effects is necessarily somewhat complicated, but the designer or fabricator wishing to apply the techniques will find an understanding of the basic principles of light behavior helpful. Fundamentally, the phenomenon is simple—light enters the plastic, is reflected efficiently back and forth by the polished surfaces, and remains in the sheet until it reaches the opposite edge, or until it strikes a point where the surface has been disturbed. In practice, however, there are many complicating factors involved which may lead the designer into difficulty unless he understands the primary principles of light behavior.

The internal reflections which regulate the passage of light through a transparent medium are dependent on the so-called critical angle of the material. Light passing from one material into another at any angle other than a right angle with the surface is bent or refracted. (Figure 1.) As the angle of the incident ray increases, the angle of the refracted ray also increases. When a light ray in air strikes an acrylic plastic at the greatest possible angle with the perpendicular, that is, at an angle practically parallel to the surface of the plastic, it will enter the plastic at an angle of 42.2 degrees from the perpendicular. The complement of this critical angle, the angle between the ray and the surface is, of course, 47.8 degrees.

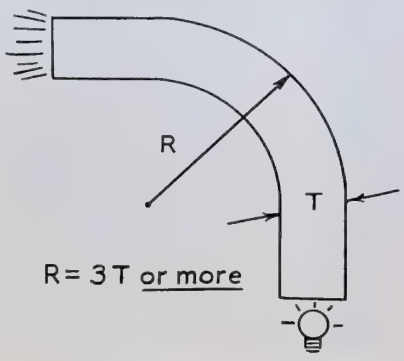
Conversely, if the ray of light in the plastic hits an outer surface in contact with air at an angle more than 42.2 degrees with the perpendicular, it cannot escape, but is reflected from the surface internally and rebounds, at an equal and opposite angle, within the plastic as indicated by lines AOA' (Figure 2). If the two surfaces of the plastic are parallel, the internally reflected rays rebound from one surface to the other, advancing lengthwise through the material but remaining entirely within it, until the edge opposite the point of entry is reached (Figure 3.) If the plastic is curved the minimum outer radius of curvature that will carry light without serious leakage can be determined by mathematical derivation but, loosely, it is three times the diameter (or thickness) of the plastic. For example, 1-inch rods can be bent to a 3-inch radius without allowing important light leakage (Figure 4).

As explained above, critical angle, technically, describes the angle between the light ray and an imaginary line perpendicular to the surface (Figure 5). Experience, however, has shown that fabricators and designers find it more practical to deal with the complement of this angle. For this reason, in the discussion that follows, the 47.8 degree value has been chosen.

USES OF LIGHT PIPING

The more spectacular effects of light-piping—such applications as cold-light

FIGURE 4—If the plastic is curved, the minimum outer radius of curvature that will carry light without serious leakage is, roughly speaking, three times the thickness of the acrylic plastic.



medical instruments or mysteriously spotlighted signs—have a tendency to overshadow other important, though less obvious, uses for the phenomenon. Designers take advantage of light-piping in as simple an article as a Plexiglas jewel chest or cigarette box. In a traditional design, using right-angle corners and square bottoms, the top edges of such a piece are dull and lifeless because the light simply passes from the top edge through to the bottom. If, on the other hand, the sides and bottom (or the ends and bottom) are formed as a single curve piece, the top edge will be brilliant—glowing with the light that enters one edge emerging from the other. When curved sides or ends are not desired, it is often practicable to bevel the bottom corners to 45 degrees and thus secure considerable edge brilliance (Figure 6).

Edge-lighting can be achieved by excluding air from a surface without actually destroying the surface. Any material which adheres tightly to the plastic and thus excludes the air will glow when seen from the opposite side of edge-lighted sheets (Figure 7). Such coatings produce the same result as shading or engraving the surface; that is, they change the angle at which light beams striking the surface are reflected.

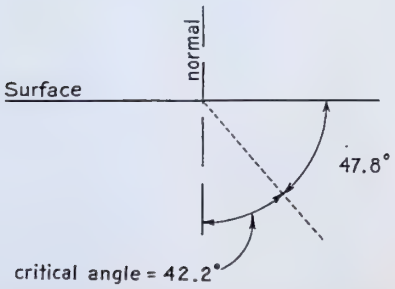


FIGURE 5—The critical angle describes the angle between the light ray and an imaginary line perpendicular to the surface. It is more practical, however, to employ the complementary angle.

The coating or machining, being the immediate source of the escaping light, appears to glow. Obviously, since the flowing design is due to internal reflections, the design is more brilliantly lighted when viewed through the surface opposite the interruption than it is when seen direct. In the former case the light seen is reflected from the interruption and is nearly all visible, but in the latter instance, the only light visible is that which has been able to escape through the interruptions. Opaque paints are often used in producing edge-lighted designs and these, of course, must be viewed through the plastic.

The most brilliant effects are obtained when all possibility of light transmission is blocked since a portion of the light in an edge-lighted panel will be transmitted if the interruption is not opaque. Machined or embossed designs, for example, may be filled with opaque pigments of the proper color. Unpainted, sand-blasted surfaces are brighter than simple machined areas since they are more irregular.

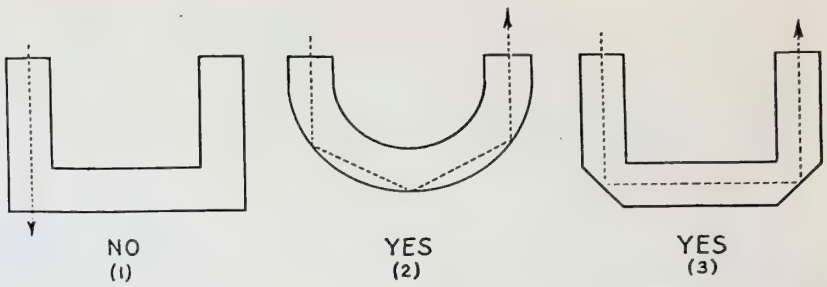


FIGURE 6—In a traditional design, using right-angle corners and square bottoms, top edges are dull and lifeless because light simply passes from the top edge through to the bottom (1). If the sides, ends, or bottoms are curved or beveled, the top edge will be brilliant, glowing with light that enters one edge and emerges from the other (2 and 3). Style of the article determines method.

PRODUCING EFFECTS

A variety of techniques is available to produce different effects (Figure 8). A painted design glows with a uniform diffuse light but actual cutting of the plastic surface produces sparkling highlights. An engraved line appears most brilliant, seen directly, if given a "V" profile. A "U" profile reflects a thin highlight from any angle. A square groove is not well lighted on the flat bottom, but is brilliant on the sides which are least visible.

Scribing, as distinguished from engraving, consists of closely spaced lines and is reminiscent of dry-point etching. Since these lines are microscopically rough they are evenly lighted at any angle. Highlights, in this process, are made by using masses of fine lines. Since there is always some of the original surface not disturbed by scribing, the reflection of the light is extended from one interruption to another, and a uniform illumination results. Many pleasing results are obtained by combining several techniques.

Painting in Light

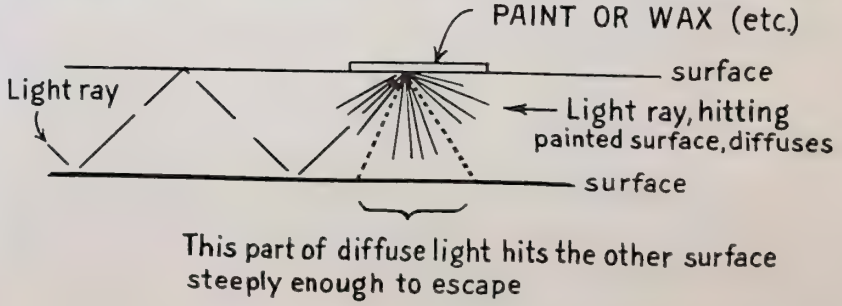
If the edge through which the light enters the sheet is colored with a transparent dye, a white painted or an engraved design on the sheet will be similarly colored (Figure 9). If different colors are spotted along one edge, blended colors in the design are produced (Figure 10). One technique, known as "painting in light" has been found especially effective. It is produced by engraving parts of the design on successive sheets of plastic so that when bound together an entire scene is represented. The edge of each sheet is colored as desired, and when edge-lighted the complete scene appears in depth, light, and color.

There are endless variations for this process. If desired, some of the engraving can be placed on each side of all but the top sheet. The back surface of each sheet, of course, reflects the most light but the reduced brilliance of front-surface reflection from the back sheets may be useful in certain designs. Paint and engraving may be combined for still further modification of the result. The distance between the sheets may be varied or each of the sheets may be of different thicknesses. In some cases the designer may find it desirable to cut out sections from one or more of the sheets. If color is added to the edge thus formed, light of pleasing tint may be thrown on some other part of the design.

It is often desired to provide some sort of backing for an edge-lighted panel. This need be nothing more than a single sheet of paper or other material, and any color or design may be chosen. Such a background, being unattached to the sheet, remains unlighted when a design is illuminated.

Here again is one of the places where the originality of the designer can be used to produce almost endless variations in the effect. By having the background color match that of the design painted on the plastic a sign can be made to appear or disappear as the light goes on and off. If the edge of a sheet is colored red and the design is white against a white background, the design is only faintly visible when not illuminated. When the light is on, how-

FIGURE 7—Paint, wax, or any material which disturbs the air-acrylic relation, will glow when the sheet is edge-lighted. Such coatings produce the same result as shading or engraving the surface: they change the angle at which light beams striking the surface are reflected. Any material which adheres tightly to the plastic will glow when seen from the opposite side of edge-lighted sheets.



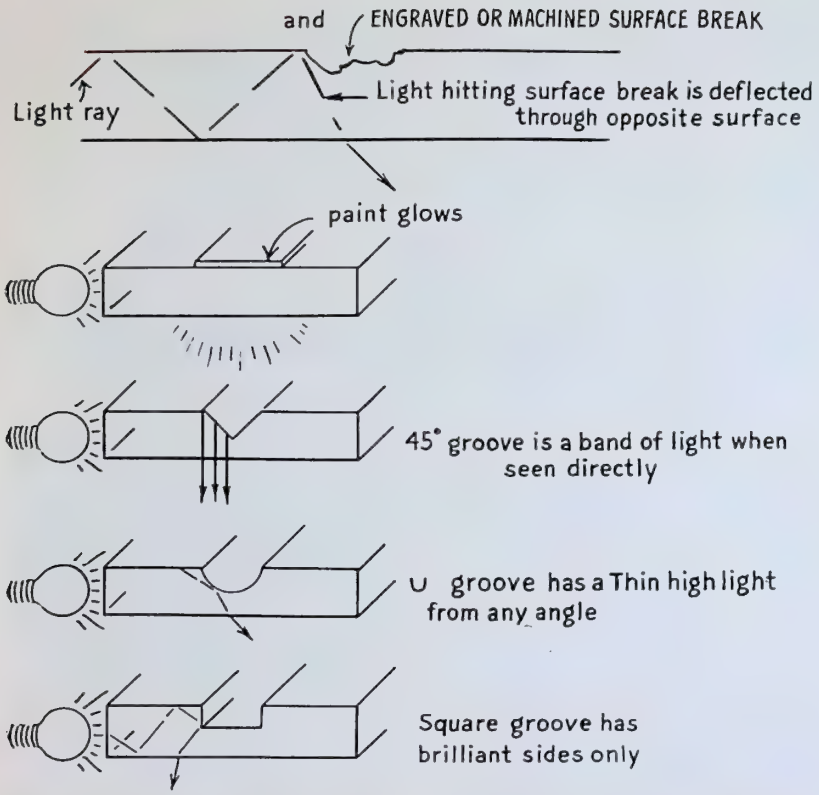


FIGURE 8—A variety of techniques are available to produce the different effects. A painted design glows with a diffuse light, but actual cutting of the surface of the plastic produces sparkling highlights. An engraved line appears most brilliant, seen directly, if given a V profile. A U profile reflects a thin highlight from any angle. Square-cut grooves will have only sides that are brilliant.

FIGURE 9—If the edge through which the light enters the sheet is colored with a transparent dye, a white-painted or engraved design on the sheet will be similarly colored. There are endless variations of this process. The back surface of the sheet reflects the most light, but the reduced brilliance of front-surface reflection from the back sheets may be useful in designs where brilliance is not needed.

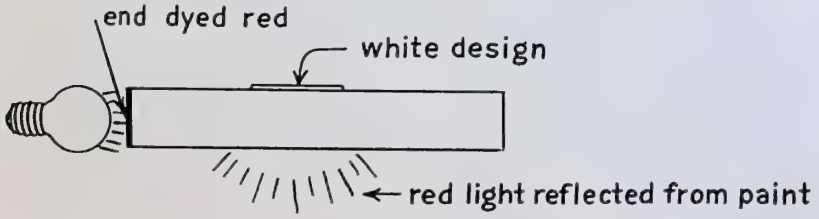
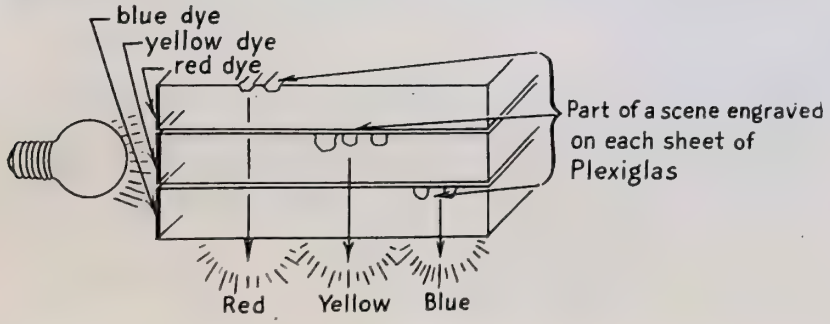


FIGURE 10—Painting in light is produced by engraving parts of the design on successive sheets of plastic so that, when bound together, an entire scene is represented. The edge of each sheet is colored as desired, and when edge-lighted the complete scene appears in depth, color, and light. It is often desired to provide some sort of backing (even a sheet of paper) for an edge-lighted panel.



ever, the design becomes luminous in red light while the unlighted background remains uncolored and appears gray.

Radiant Walls

Another application of this principle is in interior decoration to produce the so-called "radiant walls." The surface of the wall is covered with a sheet of Plexiglas in which an appropriate design is painted or engraved (Figure 11). Light is given off from the surface covered by this design—enough light to provide an entire room with soft, low illumination.

The entire surface of the plastic sheet cannot be covered by painting or engraving and still be edge-lighted satisfactorily. The design must be intermittent to allow the light to reflect back and forth between the surfaces, otherwise the light is largely diffused from the sheet through the portion of the design nearest the source and the balance of the sheet will be very dimly lighted. In general, the less decoration, the more intensely the sheet is lighted.

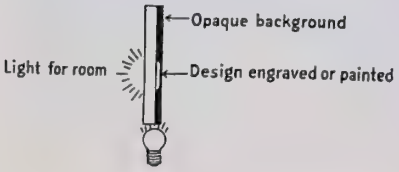
The color of a painted surface also bears a relationship to the light transmission from a sheet. When light strikes a painted pattern, some is absorbed, some escapes from the sheet making the design glow, and the rest continues to travel within the plastic. The more light that is absorbed by the paint, the less there is to be reflected out to illuminate the design and to reach other parts of the design. Paint applied to a panel, therefore, should be fairly light in color, preferably white.

The area of decoration that can be adequately illuminated varies directly with the sheet thickness. For example, a 2-inch disk painted on 1/16-inch material will be poorly lighted in the center, but when painted on 3/8-inch material it is evenly illuminated throughout. Obviously, the thinner the sheet, the closer the two reflecting surfaces and the more frequently the light rebounds between them (Figure 12). Hitting at shorter intervals all available rays will be diffused sooner in the thinner material.

Light which is not diffused from a design in a decorated sheet normally escapes from the edge opposite the source of light. To prevent loss of this light, provision should be made to reflect it back into the sheet (Figure 13). In theory, this is done most effectively by mirroring that edge of the sheet. However, in most cases, the best method is to paint the edge with opaque white paint. By this means the light is rediffused and a large portion is turned back into the sheet.

One of the difficulties in edge-lighting designs is the securing of sufficient illumination over a large area. There is no one solution to this problem. Each

FIGURE 11—Another application of this principle is in interior decoration to produce radiant walls. The wall is covered with an appropriately engraved sheet of the transparent acrylic plastic.



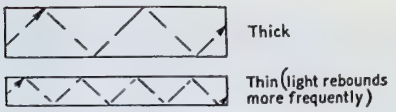


FIGURE 12—The thinner the sheet of Plexiglas, the closer are the two reflecting surfaces and the more frequently the right rebounds between them, thus making for more brilliant light use.

separate case requires individual handling, but there are some considerations which may be applied effectively in many instances. The thickness of the material is of primary importance since the wider the edge, the greater the quantity of light that will enter it. However, other conditions often set narrow limits on the thickness of the material that can be used.

The character of the edge through which the light enters the sheet is also important. It should be polished and be at right angles with the sheet surfaces. A rough, beveled or wavy surface will transmit light into the material at angles some of which permit it to escape immediately.

SOURCES OF LIGHT

Much can be said regarding the source of light. Experiments have shown that the ideal source is a line filament lamp with the edge of the plastic as close to the light source as possible (Figure 14). In practical application, however, a filament source of this type is objectionable because of the heat developed. Moreover, line filament lamps are not readily available in the length required in many applications. Because of these limitations, line filament lamps have been generally replaced with fluorescent tubes. The intensity of illumination produced by fluorescent lamps is less, since only a comparatively small amount of the light from a tube can be directed into the edge of the plastic, but the tubes are practically free from heat and are available in quite satisfactory lengths.

When more intense light is desired and fluorescent tubes are not practical, special methods of lighting with hot filament lamps may be devised. Line filament lamps could be used by separating the plastic from the tube with a piece of tempered glass. The lamp should be placed at the focus of a metallic reflector, having a radius about one-third more than that of the tube. This reflector should be brought up around the tube, completely enclosing it except for a deep slot at the top. A piece of tempered glass placed in this slot in contact with the tube, provides the base on which the plastic rests. This arrangement secures most of the lighting value of the line filament lamp without exposing the plastic to undue heat hazard.

Another method of lighting employs small incandescent bulbs. Polished holes, about an inch larger than the diameter of the bulbs to be used, are made in the edge of the Plexiglas (Figure 15). The centers of the holes are located at a distance of about twice their diameter from each other. In use, bulbs are inserted in the holes just far enough to give maximum illumination. Light enters the sheet all around the perimeter of the holes, and the sum of these perime-

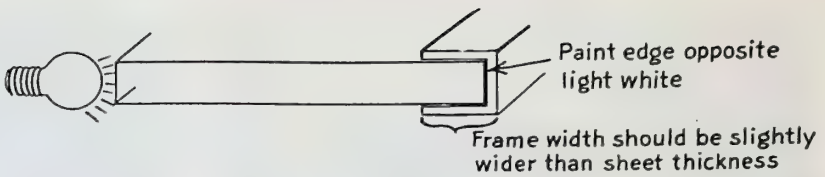


FIGURE 13—Light that is not diffused from a design in a decorated sheet normally escapes from the edge opposite the light source. To prevent loss of this light, provision should be made to reflect it back into the sheet. This is done most effectively by mirroring the edge, or painting it with an opaque white paint. By this means a larger portion of the light is re-diffused throughout the plastic.

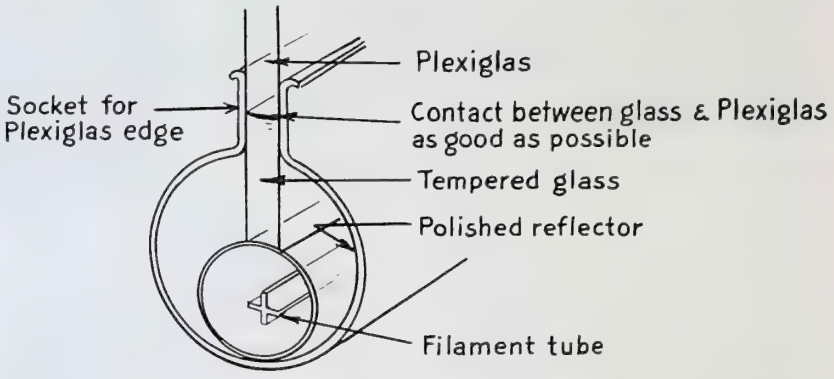


FIGURE 14—Experiments have shown that the ideal source of light is a line filament lamp with the edge of the plastic as close to the light source as possible. In practice, however, it is objectionable on account of the heat developed. Moreover, line filament lamps are not readily available in the lengths required for many applications. Figure shows a method for using glass to reduce the effects of heat.

FIGURE 15—Another method of lighting employs small incandescent bulbs. Polished holes, about inch larger than the diameter of the bulbs to be used, are made in the edge of the plastic. The centers of the holes are located at a distance of about twice their diameter from each other. In use, bulbs are inserted in the holes just far enough to insure their giving maximum illumination.

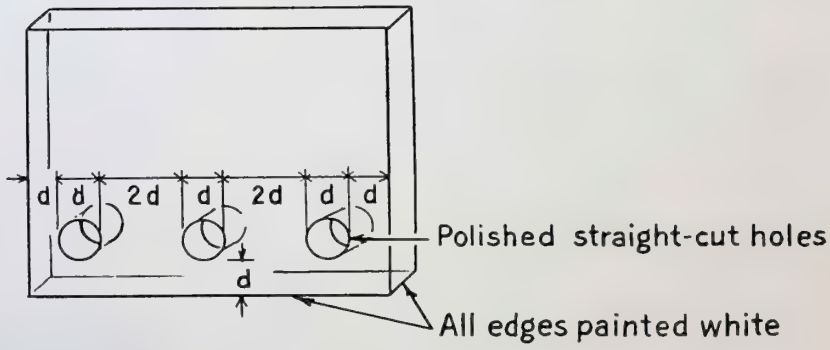
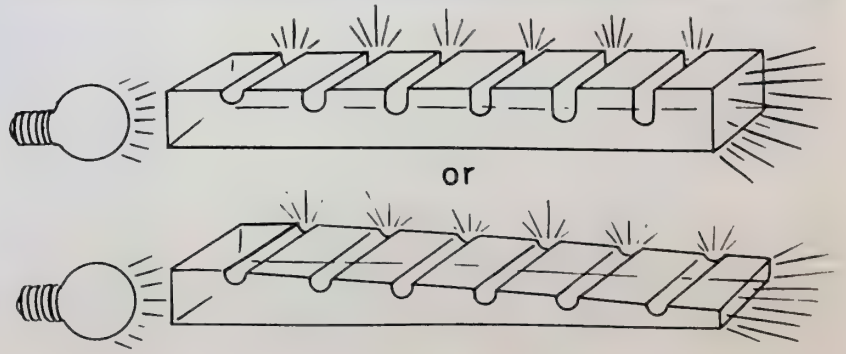


FIGURE 16—Methods to provide an even light reflected along the whole length of a bar include either the use of progressively deeper engravings (upper drawing) or engravings of the same depth on a tapered bar (lower drawing). Rays more nearly parallel to the axis of the wedge will travel farthest before they strike the engravings. A distant concentration of light may also be affected this way.







PLEXIGLAS EDGE-LIGHTED MURALS in the Sheraton Lounge, Sheraton Hotel, New York, provide decoration as well as supplemental room illumination. Each panel, designed and executed by the Endicott Corporation, is in glowing colors. Lighting is supplied by a single fluorescent tube in each box.

ters is somewhat more than the length of the straight edge of the sheet. This method, therefore, has the advantage of introducing light on a longer surface than a single edge and a rather intense light is available. Since in this system light enters the sheet in all directions, it is necessary to paint all four edges of the sheet to keep light from escaping.

Uniform illumination of an edge-lighted sheet is often difficult to obtain, but designers can employ various devices to avoid trouble from this source. In many cases it is practicable to light the sheet on two or more edges to increase the amount of light available. In other instances, the design itself can be planned to compensate for the lighting characteristics by avoiding the placing of large masses of engraved or painted areas in any one spot. It is especially important to avoid such masses near the light source.

In a short edge-lighted piece uniform illumination can be obtained by making the engraving progressively deeper as the distance from the light source increases. In such a case the light that is traveling along essentially parallel lines in the small area may be a sizeable fraction of the whole illumination and the progressively deeper cuts under these conditions reach successively lower "layers" of the parallel light. Each cut, therefore, receives nearly the same amount of illumination. This device is not effective in large areas, because in such cases the near-parallel light, spreading through the bigger sheet, is employed in lighting the portions farther from the source.

Another device which aids in providing even illumination in short edge-lighted pieces is tapering the piece so that it decreases in thickness as it gets farther from the source of light (Figure 16). The rays that are more nearly parallel to the axis of the wedge will travel farther before they strike the surface at an angle great enough to allow them to escape. In addition to its use in improving the illumination of a design, this device is also helpful for concentrating light rays at the end of a bar in such light-piping applications as are used in dental or medical instruments.

In some cases the decorative and functional applications of edge-lighting are most effectively combined. Light fixtures can combine edge-lighting with the direct light for beautiful effects. Advertisements in color and light can be made in this way and signs such as "stop" signs or "Walk—Don't Walk" signs, that are visible only when lighted, are practical attention-getters.

A WORD OF CAUTION

While edge-lighting and light-piping open a wide field of uses, there are certain limitations to their application. Obviously, dirt and scratches on the acrylic material disturb the surface the same as paint or engraving, and such defacement will be edge-lighted with the design. When edge-lighting is used where the plastic is greatly exposed to scratching or soiling it is sometimes desirable to cover the panels with a protective sheet of glass. Edge-lighting is also limited in its application on large outdoor signs because of the difficulty in securing adequate illumination over a large area. But these limitations of edge-lighting are negligible compared to the many useful applications to which it can be put.

EDGE-LIGHTED, ENGRAVED PLEXIGLAS can be used in a variety of places, as indicated by these pictures from the Walford Restaurant, Newark, New Jersey. Designed and executed by the Endicott Corporation, the clock and the triptych mural glow in light orange against an opaque background.





Review of Developments in Theatre Seating

Manufacturers' Words and Pictures Describe The Advances in Chair Comfort for Patrons

Theatre seating, always a topic of vital concern to all theatre owners, assumed proportions of vital importance during the war years when the manufacturers were converted to other activities. With the coming of peace, the critical situation persisted because of the shortages of the two vital elements of chair manufacture, steel and upholstery material.

Although the seriousness of the situation has been somewhat alleviated during the past year, design engineers have not been idle, devoting considerable time to the development of better theatre seating.

The major development of the year has been the entry of several items into the field of theatre chairs with retractable seats, a field heretofore dominated by a single example. Not all the new models are, however, in commercial production, nor are all manufacturers overtly interested in the market. And there is at least one manufacturer that is known to be holding pertinent patents—but keeping mum on the details.

The other major development in all types of chairs is a redesigning better to fit the seated patron to create more comfort while watching the show.

To review the situation briefly and to point up these two developments, the following material is presented, condensed without comment from material supplied by the several manufacturers.

AIR-O

Considerable interest followed the announcements of Air-O Seating Corporation's new Slideaway auditorium chair. The Slideaway chair is said to offer the advantages of several patented new features, including a sliding retractable seat of entirely new design.

The new chair was designed by Peter F. Masucci, president of Air-O Seating. Masucci was formerly with the Heywood-Wakefield Company, and has been associated with the industry and with the problems of theatre seating since 1927.

The Slideaway chair is the result of more than four years of intensive study and engineering development, based on his long personal experience with theatre seating conditions. The design has been developed for practicability in rows, and adaptability to main floors, loges, and balconies, as well as for maximum comfort in each individual chair.

Most distinctive among the patented new features of the Slideaway chair is the novel sliding seat which incorporates simplified mechanical principles not found in any other theatre chair. The extreme simplicity of the sliding mechanism is said to assure absolute foolproof operation and freedom from maintenance. Forward and backward sliding movement of the seat is accomplished merely by shifting the weight of the body. The action is smooth, silent, and immediately responsive.

Another basically important characteristic of the Slideaway chair is its stationary back. While the seat slides forward and back, the chair back remains motionless.

Discussing the advantages of the stationary back, it is pointed out that this feature permitted a departure from the usual theatre chair contour and to achieve important space saving characteristics in the design, while providing improved seating comfort. Through an anatomical study of sitting postures, it was found that the average theatre-goer will usually rest his shoulders against the chair back, leaving several inches of space between his lower back and the chair upholstery. The designer set out to make use of this wasted space. He redesigned the contour of the back and upholstery to provide maximum normal body support. At the same time, the saving in space was used to allow for additional knee space between rows.

In a 32-inch back-to-back installation, the sliding seat, when fully retracted, provides a full 6 inches of extra passageway for patrons moving in and out of a row, thus causing the least possible discomfort to those who are already seated.

As further pointed out, the new chair back design has made practicable and desirable a chair in which the slope of the back is the same regardless of whether it is installed on the main floor, in loges or in balconies. Also, where a moving back might be obstructed by risers in loge and balcony, the stationary back is perfectly adaptable.

Another major advantage which is claimed by the manufacturers of the Slideaway chair is the provision for relaxing changes of posture. The sliding seat permits easy, comfortable changes of position while the slope of the stationary pack provides proper support at all times. Normal impairment of blood circulation caused by remaining in one sitting posture for a protracted period is a serious theatre seating condition which is said to be corrected by the multiple posture adaptability of the Slideaway seat.

Improved sight lines are another advantage pointed out by Slideaway's designer. When the sliding seat is fully retracted, the occupant's eye level is raised a full four inches, permitting a small person to adjust his posture comfortably so as to see better when seated behind a taller person.

THE SLIDEAWAY CHAIR of the Air-O Seating Corporation includes in its new design a retractable seat which is claimed, as illustrated here, to add 6 inches to the passing space.



E-Z-PAS

The E-Z-Pas seat, as invented and patented by Arthur J. Jungerman, recedes automatically when the patron rises naturally, stepping backward instead of forward, as is neccesary in the manually operated seat; thus providing ample room for the passer-by. E-Z-Pas seat remains up and back so long as unoccupied. On resuming his seat the patron sits down without using his hands, the seat descending by the pressure of the body.

This movement leaves the passage open and unobstructed allowing the theatre to be quickly emptied, averting panic in case of fire or other debacle.

As expressed in writing by one fire chief, "After making a careful inspection of your chair (E-Z-Pas) the self-raising seat automatically clears the aisle in front of it, thus affording very little, if any, confusion in making a hasty exit in case of an emergency."

This automatic rise of 12 inches and more in the E-Z-Pas leaves ample clearance for cleaning, making it unnecessary to raise every seat in the house manually, many of which tilt back to within a few inches of the floor.

THE E-Z-PAS CHAIR of Arthur J. Jungerman has an automatic rise (as indicated by the dotted lines in the picture) of 12 inches, leaving ample clearance for patron passing and maintenance.





THE AIRFLO CHAIR, in the club-chair model, by the Heywood-Wakefield Company, is constructed of steel and operates on a spring-base principle which adjusts itself to the patron's comfort.

E-Z-Pas seats do not require additional space, but occupy no more area than the regular manually-operated seats, nor can the occupant use the adjacent seat to deposit a purse or other article that may be pilfered from the rear, forgotten, or lost.

The seat is supported at the front by seamless tubing legs turned to horizontal when passing under the seat and riding in bearings under seat.

The lower parts of legs turn on spindles near the bottom and front of standards.

Similar but shorter legs on spindles higher up and farther back on standards support a horizontal shaft riding in bearings on rear bottom of seat and on which shaft is a pair of torsion springs, right and left, which raise rear end of seat thereby drawing front legs back and guiding seat rearwardly in a horizontal manner about six inches from the down position.

The seat when occupied rests on a cross member on rear legs; the operation both up and down is noiseless due to the use of rubber bumpers.

Another feature is that this improved seat may be installed where chassis already placed is in good condition.

HEYWOOD-WAKEFIELD

The post-war line of Heywood-Wakefield theatre chairs was introduced last fall at a national sales convention. Four brand new items were spotlighted during the session, comprising the new Encore chair, in fully upholstered and semi-upholstered models, and two models of new spring-base chairs which will be sold under the name Airflo.

The new Heywood-Wakefield chairs are available in numerous and standard colors. Aisle lights, with adjustable louvers, are treated as part of the standards, and not as separate appliques.

The ratio of the back to the seat of all the new Heywood-Wakefield chairs was determined by a scientific study, sponsored by Harvard University and undertaken by its eminent anthropologist, Dr. Earnest A. Hooton.

Among the features of the new line is the assurance of comfort over the full area of the seat: it is not necessary, for the patron's comfort, that he be forced to sit right plumb in the center of the seat.

The Encore, an all-purpose, scientifically proportioned theatre chair, was designed by Leo Jiranek. Made of an enclosed, all-steel construction, the seat is mounted on a self-raising, all-steel hinge. It raises the seat gently, not abruptly, and permits the seat to come to rest just inside the end standards for easy ingress and egress. At the same time the seat is not so far back that it can be missed by a patron attempting to sit down. The Encore may also be obtained in a non-raising type. The series is also available with either a deep-coil mattress spring or padded back.

The all-steel bottom board of the new Encore makes a simple operation out of the task of changing damaged seat covers.

The back panel is full length, constructed with rolled edges to cover the raised seat. The seats are available with upholstered arms or upholstered over sponge rubber. Arm rests in natural birch, with a satiny smooth lacquer finish, can be obtained.

The end standards are in simple classic design, with an enameled panel edged with chromium-plated steel molding. The flared-out rub motif not only adds to the attractiveness of the design, but also contributes to the strength of this most vital part of the theatre chair.

The fully-upholstered version of the new Encore chair has a triple-thick base fitted with tempered coil springs securely mounted on the all-steel back panel. The seat has a coil-spring unit, and the arms are upholstered over sponge rubber pads. Like all other Heywood-Wakefield chairs, this one has an all-steel frame just over the all-steel bottom board panel.

The double Encore unit, with its steel-center standards, re-emphasizes the all-steel construction of this newest addition to the H-W line. The steel edges around the backs give added life to the upholstery fabric. The seat cushions are upholstered with coil spring units and the backs are thickly padded. The arms are of seasoned birch wood finished in natural lacquer. The end standards are all-steel.

The most luxurious theatre chair introduced by the Heywood-Wakefield Company is the spring-base Airflo line, designed by Leo Jiranek. Incorporating the latest posture theories, the scientifically proportioned Airflo has a back and seat construction made with all-steel hinges which conform and are adjustable to the movement of the occupant. The chair operates on a spring-base principle which adjusts itself automatically to a person's most comfortable position.

THE ENCORE CHAIR of the Heywood-Wakefield Company features the all-steel hinge, raising the seat gently and permitting it to come to rest just inside the end standards for easy access.





THE AIRFLO CHAIR, in the quasi-wingback type, by the Heywood-Wakefield Company, has an extra thick back and a deep seat both fitted with coil spring units. Ends are standard.

The extra thick back and the deep seat are both fitted with coil-spring units, and the arms are upholstered over sponge rubber pads. The chair is also available with a standard head rest.

The seat may be had in either a self-raising or non-raising model.

The seat and back are attached to the end standards only at the all-steel hinge, leaving the chair free to assume the most comfortable position when occupied. The enclosed all-steel construction eliminates catching of wearing apparel or snagging of stockings. The end standards are finished in a simple classic design, with an enameled center panel and chromium-plated steel molding.

IDEAL

Development of a new type of theatre chair, known as the Ideal Slide-Back chair, was announced by William A. Gedris, president of the Ideal Seating Company.

Affording more than 6 inches of smooth, effortless retraction on a horizontal plane, with no humps and no jarring, this new chair when occupied, allows 100 per cent more passing space than conventional chairs. When unoccupied there is a gain in space of over 50 per cent. Thus, the necessity of standing to allow others to pass is actually, and not just theoretically, eliminated. Furthermore, the operation of the chair in no way disturbs those in the row behind. Normal position of the chair is automatically resumed after a person passes.

When unoccupied, the seat automatically and silently slides back, rises and locks into position, thus making it the only chair of any type that affords 100 per cent safety in case of emergency. The seat automatically disengages as the patron lowers it for occupancy.

A full-length, die-formed, steel back panel entirely covers the seat cushion. There are no pinching hazards, no sharp edges to bump shins, and no understructure to hamper cleaning.

Simple in construction, the Ideal Slide-Back chair has only three more

moving parts than conventional chairs. It has been sturdily built for long, positively trouble-free service, without maintenance, adjustments, or replacements of any moving parts. The special bearings require no lubrication.

Easy to install, the chair does not require the services of specialized mechanics.

The Ideal Slide-Back chair is adjustable to meet all theatre seat requirements, all arrangements, all floor inclines, and can be used as a stationary chair in balconies with high risers.

Providing good posture, the chair has cushions of comfortable deep-spring construction. It is being offered in a variety of models, with a wide selection of end standards and upholstering materials.

INTERNATIONAL

The International Seat Corporation's new theatre chair, richly styled, offers a number of mechanical improvements. Featuring advanced styling, seating luxury, and ease of maintenance, the new chair was styled primarily for the deluxe market by one of the nation's foremost industrial designers. It will be available in three decorative treatments: Modern, Traditional, and Neo-Classic.

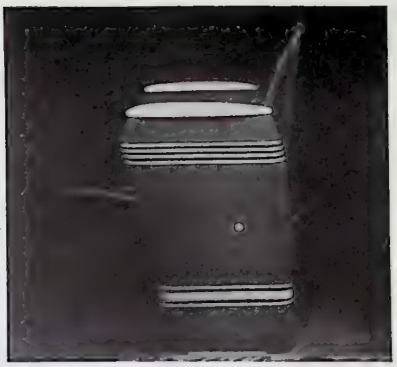
The Modern treatment reveals clean, flowing lines in tasteful combinations of upholstery and enamel colors. Seating comfort is greatly enhanced by radically-designed form-fitting and fully padded back in addition to wider cushions which utilize double-deck, full-coil spring construction.

A feature of the new chair, the extra long back extends well below the seat cushion, keeping the shoes of patrons behind it from scuffing the cushion or being caught accidentally in the forward seat. Ample floor clearance remains for proper floor maintenance.

Long-life innovations in the new chair include provisions for easy changing of chair backs and seat cushions to equalize wear around the theatre. A simple and fool-proof locking mechanism permits seat backs to be changed in a matter of seconds with a half-turn of a special tool provided for the purpose. Back pitch is not disturbed during the change, and nuts, bolts, and screws need not be removed. The entire seat cushion and pan assembly can also be detached without removing nuts, bolts, or screws.

THE NEW INTERNATIONAL CHAIR, of the International Seat Corporation, features in this model advanced styling and a trouble-free gear-train suspension entirely enclosed in seat pan.





THE SLIDE-BACK CHAIR is a development of the Ideal Seating Company, and with usual back-to-back spacing affords 6 inches additional space, as shown in the double-exposure photo.

Another innovation in the chair is its radically different seat action, utilizing a patented gear-train suspension unit which is far superior to the unsightly and troublesome seat hinge of conventional design. Located out of sight in the steel seat pan, the gear-train unit is noiseless in operation and requires no maintenance. It provides a positive seat travel stop at both the raised and lowered position. Effect of the new suspension is to move the seat in an elliptical arc, permitting maximum passing clearance between rows, as well as increased floor clearance and protection against cushion scuffing. Damage due to patrons riding the seat down is greatly reduced. Seat cushions may be equipped with an automatic uplift which silently moves the cushion to its maximum raised position when unoccupied.

International's unit construction, by which chairs are delivered as a factory-assembled unit, is retained in the new model. In this way, complicated assembly on the job is avoided and proper back pitch of chairs is assured by eliminating possibilities of unintended change during installation.

The new International chair is also of all-steel construction. Backs, seat pans, and aisle panels are formed of seamless steel. Steel side plates and standards are welded at strategic points for maximum durability.

Tackless upholstery of both back and seat cushions on the new chair is effected by locking the fabric to the all-steel back and seat pans by means of continuous steel binding rods. The even tension of the rods on the fabric at all points holds it firmly in place, eliminating lumping and bunching of the fabric, and ensuring long fabric life. Binding rods are easily removed for re-upholstering purposes.

Metal finishes on the new chair are of baked enamel for maximum durability. Arm rests of distinctive new design are of kiln-dried hardwood with a finish new to the theatre chair industry.

The newly styled aisle panels provide greater accessibility for bulb replacement, together with more efficient light distribution.

Upholstery materials used on International chairs are the widely heralded new plastic-coated Redolite, made by Goodall Fabrics, together with a wide range of woven fabrics.

KROEHLER

Ten years ago, Kroehler announced to the theatre world the revolutionary Push-Back seat. Theatre owners were at first skeptical. Then, as this new type seat was installed in theatre after theatre, owners were thrilled to find that seats alone could draw crowds of patrons from one theatre to another.

The Kroehler Push-Back seat is made by the Kroehler Manufacturing Company, world's largest furniture manufacturer. Built into the Push-Back seat is all the comfort built into living room lounge chairs.

In their normal position, these seats have lounge-chair comfort with deep, soft cushions covered with a variety of fabrics, including leather-grained, long-wearing, flame-resistant Terson. This is a vinyl resin plastic coated fabric made by Athol Manufacturing Company. A slight movement of the body slides these chairs back smoothly, quietly, effortlessly, and quite easily. After that it is simple for people entering or leaving to pass through the theatre row without inconveniencing others.

No one need stand; there is no jostling; the bane of trampled toes is ended permanently; fumbling for purses, gloves and other articles is done away with; and, of course, the entire audience to the rear continues to see the screen or stage with completely unobstructed vision, since the patrons moving in or out do so more quickly with less effort.

Kroehler Push-Back theatre chairs with Terson coverings are the most advanced in the field. They are extremely sturdy and take up no more space than an ordinary theatre chair despite the ample room they provide for passing. A theatre that contains 1,000 ordinary seats will hold 1,000 Push-Back chairs, which cost no more to install or maintain than ordinary seats.

AMERICAN

When asked for any data on its post-war developments, the American Seating Company reported no changes in its basic design principles; but an accelerated production in an effort to meet the demand for the popular Bodiform chair. As a radical design departure during the pre-war period, the company feels that Bodiform still satisfies the most exacting quality and comfort requirements.

THE PUSH-BACK CHAIR, of the Kroehler Manufacturing Company, offers patrons lounge-chair comfort, with upholstery of leather-grained, long-wearing, fire-resistant, vinyl-resin-coated Terson.



A Business Report on the Carpet Industry

Manufacturers, Back to Products for Peace, Plan More Effective Use of Floor Coverings

DR. MERRILL A. WATSON
Carpet Institute, Inc.

I am glad to visit with you today* to talk about carpets and rugs. With the strain of converting the world to a peacetime basis, creating more problems than we appear able to bear, it seems almost impudent to discuss the plans of one industry. Public attention and interest appears to be centered, for the most part, on the far greater problems of preserving peace and maintaining a high level of economic stability in this country.

THE ECONOMIC SITUATION

We may be wise, therefore, to take a moment to examine the underlying economic situation and determine how it may effect our own plans for the future. We recognize that successful operations in our own industry are wholly dependent on the economic well being of the country. The nation today is at the peak of the greatest boom in peacetime history. What was formerly considered as a Utopian concept of employment, 60,000,000 jobs, is now a realized fact. Purchasing power is enormous. The total income to all individuals is more than 2½ times what it was before the war. Some groups, such as farmers, have over 3 times their prewar income. This should create a very favorable economic background for industries selling durable consumer goods. We find, however, that our plants and equipment cannot turn out the supply of goods wanted by our own people and those in foreign countries. Demand has far outrun supply. This has caused a rising spiral of prices and wages. This is a danger signal of disorder in our economy. If it continues, this race of prices and wages will destroy the possibility of a high level of economic stability for any extended period in the future.

It is true that the forecasts and predictions of depression, sounded since May, 1946, have brought many of the forecasters into disrepute. Every few months they have been forced to push back the date for the impending recession in business. Now it is supposed to occur in 1948 or even in 1949. Granted that it is not possible with present economic tools to correctly time forecasts of business booms and depressions, yet everyone will agree that the price situation today, particularly in foodstuffs, carries elements of extreme danger for our entire economy. Based on previous post-war patterns, such price levels as these have been followed by very substantial corrections of one kind or another, sufficient to jar our business system. I am sure you will agree that our primary domestic post-war problem is how to achieve a high level of economic activity without constantly rising prices.

If we fail to find the solution to this problem, then we shall be subjecting ourselves to the possibility of severe changes. Whatever we can do, as business men and consumers, to curtail the effects of our own demands on an already strained economy, will be helpful. Whatever we can do to promote long-run stability without inflation will be an excellent investment today.

Production

In our own industry we have more than average concern with this development. The carpet and rug industry manufactures a product, the demand for which is postponable. If demand is postponed, it may be shifted to other goods than carpet and rugs. Furthermore, demand is particularly susceptible to changes in the amount of disposable income in the hands of consumers after they have paid for food, clothing and shelter. Over the past 20 years food and rent together have taken about 50 percent of consumers' expenditures. As this percentage increases it is not hard to see that there will be less left over to buy our products. Current trends, therefore, offer a direct threat to the future economic welfare of our business.

What can we do about this situation in the carpet and rug industry? We are trying to build up the production of carpets and rugs and increase supplies as rapidly as possible. As you know, during the war our industry converted to the production of duck and blankets. At one point during the war our production of carpets and rugs dropped to about 25 percent of 1941. When the war was over, we were faced with long and difficult reconversion problems. However, we have been producing an ever-increasing quantity of floor coverings. For the first half of 1947 we produced 36 percent more than in the similar period of 1946. Incidentally, this gain in output was also registered in contract carpet. We would have produced even more if we had been able to obtain additional labor and materials. It is hoped that for the year we shall approach the 1941 peak production of 71,000,000 yards. We expect to continue increasing output in 1948, unless something entirely unforseen at the present time should occur. Manufacturers, at the present time, are naturally concentrating on the designs, patterns and colors which will make it possible to turn out the greatest yardage. As supply comes into balance with demand, there will be an improvement in this situation.

Costs and Price Levels

That is the story on production. Now, what about costs and price levels? Since 1941 costs have advanced drastically. According to published records, since 1941, prices of imported wool, on which the industry is wholly dependent, are up 40 percent, jute prices 50 percent, cotton yard prices 65 percent, and labor 73 percent. As far as we can determine, the cost of manufacturing carpets and rugs has increased, on the average, about 45 percent. In the face of this increase in costs, the wholesale price of a typical axminster carpet, as reported by the Bureau of Labor Statistics, was in June, the latest month available, 30 percent greater than in 1941. This compares with an increase of 37 percent for home furnishings and 60 percent for industrial goods generally. Incidentally, during the same period, farm prices advanced 116 percent. Again, based on published reports, carpet prices have advanced an approximate 13 percent since a year ago when OPA was in force. This is believed to be one of the smallest increases on record in the consumer durable goods field. It is not strange that one retailer said recently, "I have been checking some of the merchandise in our store for price increases. I found that carpets and rugs, with a 25 percent increase over 1941, have shown less of an increase than almost anything else we have in stock."

SELF-EXAMINATION

Now that we have covered the economics of the business, I should like to tell you about our program and our plans for the future. They should interest you because, in the long run, they will have an important effect on the consumer's appreciation and acceptance of decoration and decorative values in theaters and other public places.

Out of the Past

Let me tell you a story. When the war picture was brightening, and it appeared merely a matter of time before our enemies collapsed, a group of farsighted men in the carpet business sat down and talked about the future of the industry in broad, long-range terms. They examined what had happened to the business. They found that during the years 1923 to 1927 an average of 2.6 square yards of carpet per family had been sold annually, while only 1.6 square yards of carpet per family had been sold in the years 1937 to 1941. In other words, between these two periods, the carpet industry had lost, on the average, 1 square yard per family in sales. Furthermore, they discovered that the average family had in use but 20 square yards of carpet. When these facts were studied in the light of cold reality, it was realized that a fundamental change in thinking must take place. The industry must stimulate consumer wants for carpet. Otherwise, the demand for carpets and rugs would be

*An address delivered before the Theatre Equipment and Supply Manufacturers Association, Inc., convention on September 27, 1947, in Washington. Printed by permission of the author.

smothered in the competitive post-war period.

Renaissance

In the light of these facts the industry decided to employ a market research agency to determine principally the dealer attitude with respect to carpets and rugs. We found that the carpet industry was considered to be rather self-satisfied and inclined to take things for granted. Its national advertising was not as effective as it should be, and there was far too little of it. Our showrooms did not display properly the luxurious and decorative product which the manufacturers were selling. Our public relations were considered backward, and our relations with dealers far from what they should be. Finally, the styling and design of our products was not believed to be keeping pace with the general forward trend in home decoration.

The industry prepared a far-reaching program to meet these comments. First, we determined to bring about much closer relations with our dealers and the stores handling our products. We developed a merchandising clinic in which once a year we sit down with our retail friends to discuss how we shall increase the sale of carpets and rugs to consumers. Last year, for example, we met with over 13,000 retailers at these clinics. This year we shall take to retailers in approximately 30 cities an even more advanced type of merchandising clinic. As part of the program for these meetings we have prepared a color motion-picture film called, "Adventure in Style," narrated by Lowell Thomas. Through the cooperation of carpet clubs and floorcovering associations, we hope to meet with over 15,000 retailers. We believe this increasing cooperation between manufacturers and retailers will be a powerful influence in the home furnishings field in the future.

Our survey found that one of the basic problems confronting both retailers and manufacturers was how to develop an improved type of salesmanship at the retail level. A thorough survey of stores throughout the country was made, and on the basis of this study, a comprehensive sales training course was prepared on "How to Sell Color and Design." By the end of this year we will have distributed over 13,000 of these courses throughout the country. It is generally admitted that these courses have been of considerable assistance in raising the level of retail store salesmanship. Furthermore, they have stimulated other organizations to do a more intensive job in this field. There is little doubt but that these efforts will pay off in the competitive selling days ahead. We are now looking forward to more advanced steps in the field of retail sales training.

We are quite proud of the fact that the industry has responded so promptly to the need for improved advertising as well as a substantial increase in the quantity of advertising. This year carpet and rug manufacturers will spend several times the pre-war total for national advertising. Furthermore, the attractiveness of this advertising is causing comment throughout the entire field of home furnishings.

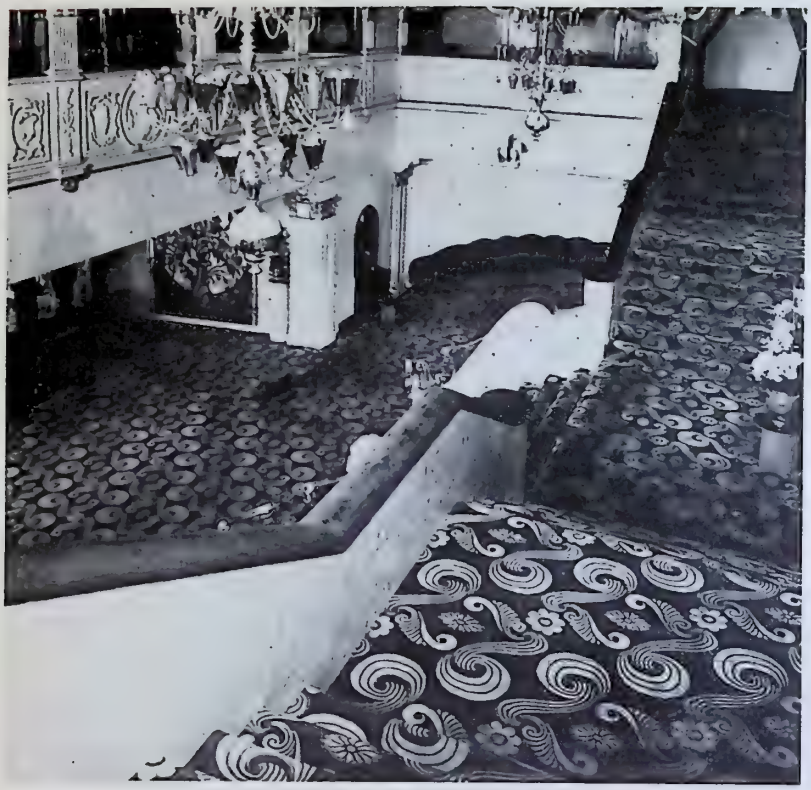
Color Coordination

Our survey found that color coordination was vitally needed if home furnishings generally were to compete more effectively with other products for a share of the consumer dollar. This was not a new idea. Many years ago the ready-to-wear industry was confronted with the same problem. As women became more fashion-conscious, and ensemble selling of ready-to-wear grew in importance, some coordination of colors in millinery, clothing, gloves, shoes, and bags became imperative. Today color coordination is a basic and accepted factor in the selling of ready-to-wear.

Some time ago the Home Furnishings Style Council was formed to develop color coordination in the home furnishings field. It was immediately recognized by the leading magazines and newspapers as an important step forward and given wide publicity. It may be credited directly with stimulating the greatest interest in the subject of color coordination ever achieved in the field of home furnishings. In fact, it may be said that as a result of this effort consumers may be assured of some color coordination program. While the administrative organization may be changed from time to time to suit requirements, it will evolve in the form necessary to do the most effective job.

THE PARK AVENUE THEATRE, New York, has Wilton-weave carpeting, in the super-Rosebrooke quality, woven by A. and M. Karagheusian. The Modern Empire motif, in varying values of autumn gold on a chocolate brown ground, expresses one of the current trends for pattern surrounded by large free areas of space to give home-like feeling to the lobby. The subdued coloring and simplicity of the motif is unusual in theatre carpeting. The entire auditorium was completely carpeted before the seat installations were made, giving patrons luxury of deep-piled carpet under seats.





NO MATTER THE POINT OF VANTAGE, where seen from a landing on the grand staircase, as the carpet of the Mohawk Carpet Mills, Inc., in the top picture, or on the floor of the lobby itself, as the carpet of the Alexander Smith and Sons Carpet Company in the bottom photograph, carpets add an air of luxury. (Top is Belmont Theatre in Los Angeles; bottom, Strand Theatre in New York.)



FUTURE COURSE

I have outlined here merely a few of the steps that were taken by the industry in its determination to employ all of the tools of modern distribution to win back a place in the market, lost over the past few decades. There have been a number of other improvements. Manufacturers' selling has improved. Beautifully decorated showrooms, which display carpets and rugs against the best possible background, have been created. Style and design have been injected in carpet and rug manufacturing to a point believed impossible a decade or so ago.

To convince you we intend to carry on our program of self-analysis, I can report that at the present time the Elmo Roper organization is making a nationwide consumer study for us on carpets and rugs.

I have told you something about our efforts to increase interest in carpets and rugs because these developments will be of growing importance to you in the years ahead. Our efforts and the work of other groups in the field are bound to create an ever-increasing consumer interest in the appearance of the home. As national advertising increases, both in interest and scope, as stores modernize, as they do a better job of selling, consumers will become more aware of the importance of home furnishings in creating better homes and better living. These developments increase the consumers' knowledge of decorative values and color harmony. As a result, consumers will be far more critical of their surroundings than in the past. They will react favorably to the type of tasteful decoration and styling in public places that they have learned to want in their homes. They will react unfavorably to garish display and bizarre ornamentation. In the case of floorcoverings, for example, we must expect that consumers, in becoming more style conscious with respect to floorcoverings in their own homes, will also become style conscious of floorcoverings in theatres, hotels, and clubs.

This is the principal point which I should like to make today. In theatres, as in homes, floorcovering forms the base for decorative effect to be achieved. In the future you will see, we believe, a more careful color coordination in theatre decoration in an effort to impress consumers through more attractive surroundings. This should mean a growing demand from your customers for more fashionable colors and more contemporary designs in figured carpets. Tastefully decorated surroundings, which add to the customers' sense of pleasure and comfort, in themselves exert a certain pulling power.

We believe you are already planning in this direction. In amusements, as in home furnishings, competition for the consumer's dollar will increase in the years ahead. For example, the possible influence of television is not yet known to any extent. It seems reasonable to assume, however, that it will heighten competition and encourage an improvement, both in the product shown in theatres and the surroundings themselves. Our industry is aware of these trends, and we will be ready to help you meet them in the years ahead.

Quality in Carpeting and Its Maintenance

A Proper Balance of All Physical Factors And the Correct Care Make Good Rugs Good

HOWARD P. HILDRETH
Mohawk Carpet Mills, Inc.

What makes a good carpet good?

No one element of construction makes a rug, but the proper coordination and balancing of all elements are necessary to produce a fabric of maximum value. Therefore, we are going to point out some of the equally important factors of materials and construction which make the rug.

Inasmuch as the sale of any woven floor covering is just the beginning of a customer-dealer relationship, it is necessary to understand how the factors of pitch, rows per inch, pile height, yarn size, and quality of materials are related to each other and must be coordinated in order to produce the most satisfactory fabric within any competitive price bracket.

CRITERIA OF QUALITY

Before going any further, we should consider the meaning of the factors which are involved.

Pitch is defined as the number of construction units ends to the inch of width. Actually, in practical floor covering specifications, is is taken as the number of pile ends per unit of standard 27-inch width. Terms of pitch used commonly in the industry are 180, 189, 192, 216, and 256.

Rows per inch is the number of rows of yarn tufts in one inch of length. These are counted in the warpwise direction.

Pile height is self-explanatory, the height of pile being measured from the top surface of the back to the top surface of the pile, that is, it does not include the thickness of the back.

Pile yarn is defined as the yarn forming the loops or tufts (cut loops) of a pile fabric.

Now let us review two equally well-known Wilton fabrics. Royal Karnak and Mohawk Saxony have been on the market for a long time and each is famous for its durability. Karnak is 256 pitch with a large number of wires to the inch, and uses a relatively light-weight worsted yarn in low-pile construction. On the other hand Saxony is 180 pitch, a medium number of wires per inch, using a heavy woolen yarn with a high pile.

No two fabrics could be more definitely opposite in type, yet by the correct use of materials and construction, each in its own particular method produces a fabric of unusual wearing qualities.

From this it may be easily seen that no one of the factors is all-important, but rather it is the balanced use of all of them that makes satisfactory merchandise.

Pile Density

One important thing to remember is that the criterion for a fabric's wearing quality is expressed by the formula,

$$D^2h,$$

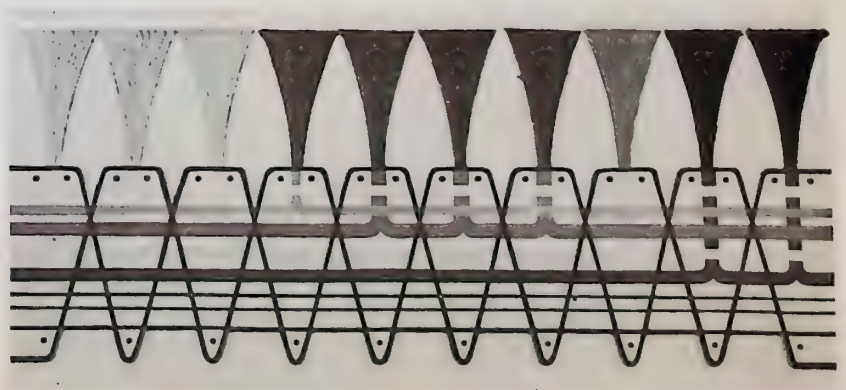
where D is the density of the pile material and h is the pile height.

It is obvious from the formula that the density, being squared, is the dominating factor. For instance, if we had a fabric with a density of 30 and a pile height of 0.2 inch and we increased the pile height by 50 per cent, we would expect a 50 per cent increase in durability. However, if we kept the pile height the same and increased the density by 50 per cent we could expect a 125 per cent increase in durability.

The whole purpose of going through this detail is to impress upon the reader that the density of the pile surface is very important and that it depends entirely upon three factors: pitch, rows per inch, and size of pile yarn. Many times the tufts to the square inch, which is the product of the pitch per inch and the rows per inch, is erroneously considered to be the density. The fallacy of this can easily be shown by drawing a hypothetical comparison which, although it may be fantastic in conception, nevertheless, will show just how important a part the size of the yarn plays in de-



THE WILTON is recognized as a luxury fabric. The finer and more expensive worsted yarn grades provide a detail and delicacy in design, through the use of the Jacquard pattern control, not possible to obtain in any other of the standard types. In the worsted Wilton, pictured above and diagrammed below, the surface yarn buried in the body of a Jacquard Wilton weave (usually seen through the back) and its consequent sturdy construction are its outstanding characteristics. As Wilton is woven in worsted in greater than other types, it is specified for cleanliness. In worsted Wilton, each fiber in the face yarn is tied into the back construction. This makes it particularly suitable where fluff would be objectionable, where cleanliness is paramount, and under conditions of frequent cleaning. In the photographs are seen two cotton chain warps, stuffer warp yarns, three binding and filling weft yarns, and two to six woolen or worsted surface yarns running warpwise. In the drawing is a cross section diagram of a five-frame, three-shot worsted Wilton fabric with three stuffer warps. (The text of his article has been prepared from publications—"Five Steps to Carpet Quality" and "Keep It Clean" (printed for general distribution to theatres and other users of carpets)—of the Mohawk Carpet Mills, Inc., with the pictures and drawings provided by the company from its manual on woven floor coverings





THE AXMINSTER is distinguished by the double row of weft binding and filling yarns, inserted by a needle thrust (easily noted on the back). It can be rolled lengthwise but not crosswise. The better grades provide deep pile and closeness of weave. The cross section (below) of a single chain Axminster shows three double shots of weft and two stuffer yarns, producing a heavy ribbed effect.



termining fabric value. Picture, if you can, a fabric of very close weave, say 256 pitch by 13½ rows to the inch, but using as a pile yarn a thread no larger than the common variety of sewing thread. Now compare this imaginary fabric with another of lesser construction, such as a 214 pitch by 7½ rows to the inch but using a heavy, full, thick yarn. It is obvious that the first fabric would be worthless, while the second would be exceptionally good. (Actually, density of pile material for mill purposes is measured in terms of grain weight of pile wool per cubic inch.)

Backing Is Important

The part of any rug or carpet which has to resist wear is the pile yarn. We have previously shown the important part this plays in the make-up of a fabric, so now is a good time to discuss some of its characteristics. Before doing so, however, we will digress long enough to point out that a rug or carpet is always a structural product. While the pile yarn is the part which has to resist wear, it is materially aided in doing this by being adequately supported by strong backing materials which form the foundation for any rug or carpet. As an example consider the Chenille rug in the Roxy Theatre which was replaced only after twelve years of continuous service, during which time more than one hundred million people walked over it. To an appreciable extent this fine record may be attributed to the support given the pile yarn by the characteristically heavy and firm Chenille type of back.

Resuming the discussion of pile yarn, the first consideration is the quality of the wool from which the yarn is spun. Woolen floor coverings are made of a blend of foreign wools grown in such places as the Andes Mountains of South America, in India, Scotland, Ireland, Iceland, New Zealand, Iraq, Tibet, and Mongolia. Each of these wools has certain desirable characteristics and by use of the right proportion of each, these qualities are imparted to the pile yarn. The Mohawk Carpet Mills spins all the yarns which go into the finished product, thus enabling them to take every advantage in the selection of wools, and to control the blending of them to assure quality stock.

After blending, the wools must be gently scoured to remove the grease and dirt which have accumulated. This process must be carefully controlled in every respect to assure proper cleaning without damage to the wool fibre. The amount of scouring solution used must be scientifically correct and the temperature must be held to the exact degree necessary to accomplish this scouring to the best advantage. Drying the wool fibre after scouring must also be carefully controlled. The use of too high a temperature or submitting it to heat for too long a period, will result in damage to the fibre which may affect the serviceability of the fabric in which it is eventually woven.

To attain the best coverage and appearance of fabric, yarns manufactured from these wools must be full, lofty, and of maximum diameter consistent with adequate strength. This is done through correlating the factors of yarn size, singles and plying twist, and tensile strength to obtain the best balanced yarn for any specific purpose.

Question of Ply

Occassionally the question arises of whether a carpet yarn should be 2-ply or 3-ply. It apparently makes no difference, so far as a fabric's ability to resist wear and tear is concerned, whether the yarn it employs is 2-ply or 3-ply. Every manufacturer of a comprehensive line of woven floor coverings finds it necessary to produce yarns in 2-ply, 3-ply and 4-ply. Three-ply yarns are sometimes required to obtain stria effects where a predominance of a certain color is required, and both 3-ply and 4-ply yarns are necessary to make heavy type fabrics like our Saxony and Scotia grades. However, in the vast majority of those rug and carpet grades on the market today, which together account for the major volume of sales, the use of 2-ply and 3-ply yarns appears to be about evenly divided.

The important consideration is to get the required material content into the surface of the rug, and if all other factors concerning the yarn—such as quality of wool stock, blending, finished yarn size, tensile strength, and so forth—are equal, it would appear to make no difference whether the finished yarn was 2-ply or 3-ply.

The formula D^2h for comparative wearing quality, previously mentioned, was derived after many years of research and study of the measurement of fabric resistance to wear. As explained, the density (D) is found from the pitch, rows per inch, and yarn size. It is significant that, with all the study given to this problem, it was never found necessary to include a term in the formula to compensate for the ply of the yarn.

Pile Height

Every manufacturer has at his disposal the means for varying the pile height over a wide range. Certain fabrics specifically require definite pile heights. Closely woven worsted grades, for instance, have a low pile; Saxony and loom-tufted Wiltons call for a high pile. However, in all instances the choice of pile height is left to the judgment and discretion of the manufacturer to produce a grade of maximum value within competitive price brackets.

We see, therefore, that quality in a rug is the result of several factors working together. A good rug is not good because its pile is deep or its pitch is high, or because of many rows per inch. These three factors, together with the quality of materials used and the

size of the yarn, must be coordinated to produce a fabric which combines a luxurious "feel" with a long, wear-resistant life.

MAINTENANCE OF QUALITY

Perhaps now you are wondering how you can preserve the beautiful appearance of these quality products of the carpet-weaver's art and to secure from them the maximum wear value.

Knowing that no carpet or rug is any better than the ultimate service it renders, the Mohawk Carpet Mills has prepared this summary describing some of the characteristics of the product and also including suggestions as to its care and maintenance. It is offered at this time with the belief that the material contained herein will serve to answer the majority of questions that may arise from time to time.

Fluffing

The first few times a new wool floor covering is cleaned, concern may arise over the apparently large amount of wool fluff which the cleaner has picked up. This is a very natural condition in all new wool floor coverings. It is brought about in two ways. Carpet yarns are composed not only of different types of wool but various lengths of staple (wool fibres). Regardless of how thorough we are in the shearing process a number of the short fibres obstinately remain in the face of the carpet. These work to the surface and are picked up by your cleaner. Also there may be a lack of moisture in the carpet when it arrives in your home.

Quite frequently rugs or carpets remain in dealers' warehouses in their original containers for some time, and consequently lose a certain amount of their natural moisture. But your carpet starts to re-absorb moisture from the atmosphere as soon as it is laid on the floor, so fluffing or shedding for this reason is only temporary.

The loss of this fuzz does not hurt the carpet in any way even though many people are inclined to think that their floor covering is slowly "coming apart." The total amount of wool lost in this manner during the life of the fabric is infinitesimal and in no way lessens the life of the rug.

Sprouting

Once in a while threads can be noticed protruding above the surface of the pile. These may be either extra long ends of tufts or pieces of backing material that have worked through to the surface. Or in an exceptional instance, it might be that one of the tightly twisted tufts in a twist weave fabric unraveled for some reason or another. These ends should always be clipped off level with the pile surface, using a pair of scissors. Never pull them out!

Missing Tufts

When a carpet leaves the loom it is still unfinished. Before it can be sent out as perfect, it must pass through certain finishing processes and a final inspection. In spite of the most rigid inspections that wool floor coverings undergo, it is possible for some to leave the mill without all the necessary tufts. To the average customer this means a "hole" in the rug, hence a serious complaint. In reality this condition is easily remedied by the dealer, who will secure yarn of the proper color and replace the missing tufts by burling in the yarn.

Pile Crushing or Shading

Pile crushing or shading is a characteristic of all pile floor coverings. It is indicative of good quality, since the condition is more noticeable in worsted fabrics and high pile wool qualities. Many persons unfamiliar with this subject sometimes think that their floor coverings contain faded spots. A faded spot will always appear the same when viewed from all sides, whereas a shaded area will appear alternately light and dark depending on whether one is facing the ends or the lay of the tufts. Also since the best and fastest dyes known to science are used in carpet manufacturing, there is little likelihood that your wool floor covering has faded.

For instance, when a carpet is taken from the loom, the tufts forming the pile surface are nearly vertical, but as soon as the fabric is put into service some of these tufts begin to slant in different directions, due to the pressure of foot traffice or the movement of heavy furniture. Consequently light is reflected from the sides of the wool fibres instead of the top. These shiny sides have a tendency to reflect light rather than absorb it, which accounts for the difference in appearance in certain areas of the carpet.

While there is no permanent solution to this condition, we can offer a few suggestions for temporary relief. First make sure that the lay of the pile is pointed away from the light. Also a good rug cushion helps to prevent excessive flattening of the pile. Reversing your rugs at frequent intervals will help to keep this condition to a minimum. Occasionally continual light sweeping with a broom will correct the wrong slant of the tufts. Wet shampooing is sometimes effective, but should be done only by professional cleaners. Also sometimes the application of a hot iron on a damp cloth over the affected area will help to bring the tufts back to a more normal position. The thing to remember is that shading or crushing is not a weaving defect.

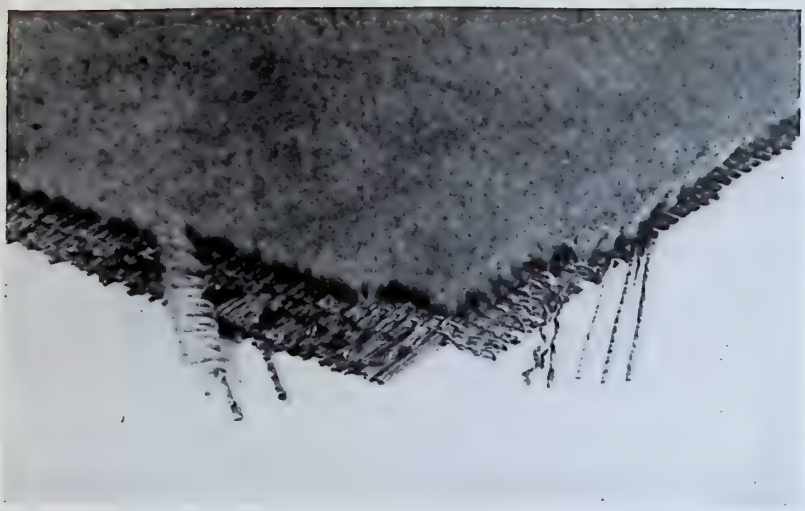
Soiling

Regardless of where you live or how often and carefully your floor coverings are cleaned, they are sure to absorb a certain amount of soil, which naturally causes a slight change in the appearance of the fabric. This soil is due partly to the dirt which is carried onto the

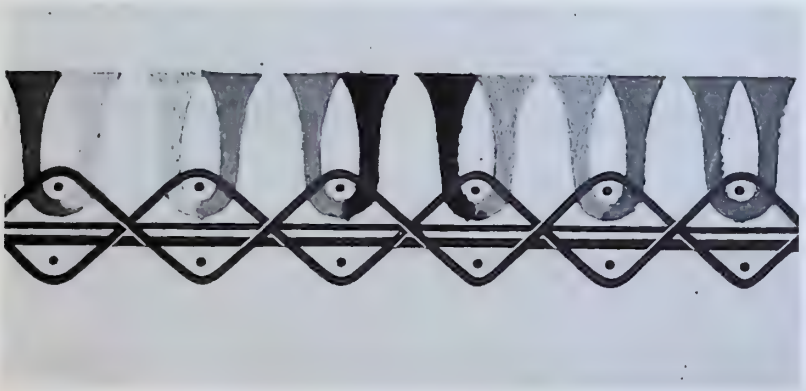


TAPESTRY CARPET (often called a hooked type) gives unusual wear on account of the uncut loops and the hooked form. The use of heavy yarn will furnish a depth of pile and also allow for variety in the height of the loops to form special texture effects. The cross-section diagram shows a two-shot tapestry with three stuffer warps. This is similar to velvet, except for the uncut pile loops.





VELVET CARPET has all surface yarn doing its full duty as it is held firmly in the back construction and is not buried too deeply in the fabric. The usual construction is a tightly woven pile of comparatively short length intended to give maximum service. Cross-section shows a two-shot velvet with two stuffer warps. The surface yarns are dyed on printing drums, according to the desired pattern.



carpet by foot traffic, and not thoroughly removed by everyday cleaning, and partly to the dust-laden air which is natural gray in color. This dust will begin to collect on your carpet the day it is laid. Even with the daily and weekly care recommended, light colors will probably become soiled. This is serious when light colors are used where traffic is heavy, or where the air contains large quantities of greasy soot and dust from home furnaces and industrial plants which burn coal. The grease and tar content of these dirt particles, often as high as 10 per cent, causes them to cling tenaciously to the pile fibres, and even daily use of an electric cleaner may not remove all of them.

This grease-laden dust may cause some discoloration in light colored carpets. For instance, a delicate rose carpet, as it becomes soiled, will gradually lose its rose tone and change to a neutral taupe shade. A light blue carpet may change to a dull gray-green. Such apparent loss of color often causes alarm, because it is mistaken for permanent discoloration or fading. However, the original color and tone can be restored by professional dry cleaning or shampooing. Cleaning of this type is the only remedy for such a condition.

Spots and Stains

Many spots can be removed without too much difficulty but—you must act promptly. Once spots have set they are very hard to take out.

The most common method of removing grease spots or spots of a similar nature is through the use of carbon tetrachloride or a soapless lather cleaner. Saturate the spot with the cleaner and then sponge with a clean absorbent cloth. Best results can be obtained by working from the outer edge to the center of the spot.

If alcoholic or soft drinks are spilled on wool floor covering, immediately apply plenty of fresh, clean, cold water and squeeze it as dry as possible using clean cheese cloth. If you do not get it all out the first time, repeat the process. But be sure you rub with the pile, not against it.

Stains or spots caused by pets are best treated by using a warm solution of diluted acetic acid or white vinegar. Saturate the stain with one of these solutions and blot up with a cloth or white blotting paper. Under no circumstances try to wash the stain out. This will only make it worse. If the stain is very bad and apparently cannot be removed, the color can be restored by stippling or painting the yarn with dye in solution with denatured alcohol by a professional rug cleaning concern.

Burns and Holes

Occasionally lighted cigarettes, cigars or live ashes may be dropped on carpets. Unlike many other materials wool will not burn with a bright flame, it will only smoulder and char. This causes a hole in the surface which can easily be repaired by sewing in new tufts.

Moths are the frequent cause of much damage to wool floor coverings. However, if carpets are cleaned regularly with an electric cleaner and exposed daily to light and air, there should not be much trouble. The places to watch are under cabinets, dressers, long chests, radiators or other heavy furniture which is not generally moved. The best preventive is, of course, frequent cleaning both of the surface and occasionally the back, moving the heavy furniture at regular intervals. Further protection can be given the danger spots as mentioned by the use of a good moth-proofing, or moth-repellent solvent solution. If rugs are to be stored, or if certain rooms are to be closed for a period, the floor coverings should be completely and thoroughly cleaned, face and back, with an electric cleaner. They may then be sprayed with a solvent-type moth-proofing or moth-repelling solution, or sprinkled evenly with a moth-repelling material, such as naphthalene or paradichlorobenzene.

Allow about 1 pound to each 108 square feet of carpet area. Roll the carpet or rug immediately, wrap it in heavy brown paper, and seal the edges with heavy gummed tape.

Wool lint and hair accumulation in floor cracks and under the quarter round and base boards provide a fertile breeding place for moth larvae. Dog or cat hairs, if allowed to accumulate, will also furnish food for these insects. A program of good housekeeping which includes regular cleaning, will prevent such sources of moth infestation. It might also be desirable to have your rugs moth-proofed by a professional cleaner as part of the commercial cleaning process.

Maintain Moisture

The wear life of carpets can be materially increased if the proper amount of moisture is kept in the atmosphere.

The amount of moisture varies inversely with the temperature. When the thermometer reading for temperature goes up the hygrometer reading for moisture weight goes down. This action is very definite. High temperatures with accompanying low relative humidity cause many complaints about wool pile fabrics. It is vital to health as well as wool pile fabrics to add moisture to the air used in theatres, homes, business places, and offices. The higher the temperature of the air the greater the amount of moisture is needed to obtain the same relative humidity. One authority strikes an average with the slogan that you must "evaporate a gallon of water per room per day against artificial heat."

In a simple form, the problem reverts to the ability to evaporate this needed water. Exposure of water in heater containers, radiator pans, fish globes,

flower bowls, plant jars, and the like will be helpful. Without any attention to this need some areas will register below 20 per cent relative humidity, causing ill health to occupants and floor covering complaints, all the way from fluffing to aggravated crush pile. Forty per cent to fifty per cent relative humidity is ideal in heated areas. Below this figure the heavy wool yarns will be robbed of moisture weight and bulk.

An indoor temperature of 68 degrees with a relative humidity of 42 per cent is accepted as an ideal condition for personal health and the preservation of furniture and home furnishings. A higher temperature with lower humidity is not only more expensive to maintain, but it is harmful particularly to nose and throat membranes and to all fabrics.

CARE AND CLEANING

The care and maintenance of wool floor coverings can be broken into three classifications: (1) daily care, (2) weekly care, and (3) periodic or seasonal cleaning.

Daily Care

Daily care should include the use of a carpet sweeper and even the vacuum cleaner on each carpet, particularly in frequently traveled areas and near street entrances. This is very important since dirt and grit, unless removed, will work down into the back of the floor covering and with continued grinding, may cut the threads and materially shorten the life of your carpet.

A soft bristled broom can also be used —but a word of caution: do not sweep in a harsh manner—if you do use a broom, sweep with a light touch and always sweep with the pile.

Weekly Care

The volume of business (number of patrons) and the hours of operation, not forgetting outside weather conditions, determine the frequency of cleaning of the areas of little traffic. At any rate all areas should be thoroughly cleaned with a vacuum cleaner once a week, or twice if the occasion demands. This cleaning is necessary in order to remove any dust deposited by the air and to guarantee the elimination of moth eggs and all forms of insect life which thrive on animal fibres like wool.

Periodic Care

This type of care and cleaning consists mostly of maintaining the general surface appearance of the fabric, at times other than the daily or weekly schedule. It would include any needed repairs to the carpet plus a yearly cleaning by a professional cleaner. In the intervening period, though, it might be necessary to brighten the pile surface which may have become soiled or discolored. This can be easily accomplished by the use of organic solvents such as the common quick evaporating cleaning fluids, without damage to the fabric or colors. The area, however, must be well ventilated so that the vapor from the fluid is removed immediately.

Absorbent powders may be used effectively for surface brightening. Cleaning materials of this type have an important advantage over fluid cleaners. They do not leave a ring and therefore the contrast between the cleaned and uncleaned portions of the carpet is less noticeable. Soap solutions are to be avoided because of slow drying and the deposit of residual fats which tend to collect dust rapidly. However, soapless lather solutions have been used very successfully. Ammonia solutions may change or remove colors, and are to be avoided.

This cleaning program is adequate for most carpets and most exposures, but certain fabrics may require additional cleaning. In this group are light colored, or white and luster type rugs, in which the luster is produced by complete cleanliness of the fibres all the way to the base of the pile tufts. In such cases the cleaning should be entrusted to a professional carpet cleaner who uses adequate and modern equipment.

Satisfactory results can be obtained by giving a wet shampoo treatment while the carpet is on the floor. However, the job can be done more thoroughly in a cleaning plant. Never try to wet shampoo it yourself. Such dangers as soapy cleaners, or excessive water getting through to the back are present even when the professional cleaner does the job.

Never shake small rugs by gripping them at one end and snapping the other. Never beat any wool floor covering on a flat surface or suspended over a line. This subjects the fabric to undue strain which may result in breaking the backing yarns, and the consequent loosening and possible loss of the pile tufts. It may also result in the breaking of the fringe or serging.

In cleaning white or pastel color carpets with a carpet sweeper or vacuum cleaner be sure that all parts of the cleaner which come in contact with the pile surface are free from dirt and grease. This can be accomplished by the use of a cloth moistened with carbon tetrachloride or such parts, before the cleaning is started.

Should the serging or binding tape on your wool floor covering become loose, instructions for its repair can be obtained by writing to the manufacturer.

Identification labels should be left on your rugs or carpets for reference purposes.

If the corners of a floor covering begin to curl, apply a hot iron to a damp cloth on both the face and back of the carpeting at the corners. Another remedy for this condition is sewing cardboard triangles underneath the unruly corners. A strong linen thread should be used for sewing the cardboard to the rug.



CHENILLE WEAVE, of custom order, has as its striking characteristics its heavy woolen back. This makes the fabric almost a complete animal fiber product which might be needed to resist dampness. This same heavy cushion will guarantee greater wear to the same amount of surface yarn. Cross-section drawing shows a four-shot Chenille weave, with two weft shots passing over the catcher thread.



Electronic Control for Stage Lighting

High-Current, Gas-Filled Thyratron Tubes Used as Contactors and Dimmers in System

GEORGE C. IZENOUR
Designer and Engineer

The electronic system for the control of stage lighting, as described in this article, is the result of a 4½-year development project, and was demonstrated for the first time at the University Theatre of Yale University, where it remains as a permanent installation. It represents the first full-scale attempt to control stage lighting by means which are entirely electronic.

THE ELECTRONIC SYSTEM

The all-electronic system for the control of stage lighting is based on the use of the high-current, inert-gas-filled thyratron tube, used both as contactor and dimmer.

All functions of both switching and dimming are accomplished in a single network which is remotely controlled and comprises two main elements: a console with attached pre-set panel, shown in Figures 1 and 2; and a tube bank, shown in Figures 3 and 4.

The console is a pre-wired steel desk, containing 44 individual control circuits, with all necessary mastering, fading, and switching controls with their associated indicating devices. Attached to it by a swivel joint is a pre-set panel containing 44 pre-set control units, each made up of ten pre-sets, thus making 440 pre-sets in all.

The tube bank is a pre-fabricated steel rack-and-gutter arrangement, wherein are plugged 44 electronic switching and dimming units, 38 being of 1.5 kw. capacity and six of 6 kw., making a total control capacity of 93 kw.

The complete system is unitized and, as such, is demountable unit-by-unit and control-by-control, from master rack and console, respectively. By means of Figures 1 to 4 and the block diagram of Figure 5, the following outline explains the function of the separate elements of this system.

The Console Desk

The console desk measures 60 by 44 by 22 inches and the attached panel 50

FIGURE 1—The console and pre-set panel. The console is a pre-wired steel desk, containing 44 individual control circuits, with all the necessary mastering, fading, and switching controls with their associated indicating devices. Attached to it by a swivel joint is a pre-set panel containing 44 pre-set control units, each made up of ten pre-sets, thus making 440 pre-sets in all. The all-electronic system for the control of stage lighting is based on the use of the high-current, inert-gas-filled thyratron tube, employed in the role of contactor as well as in the part of the dimmer.



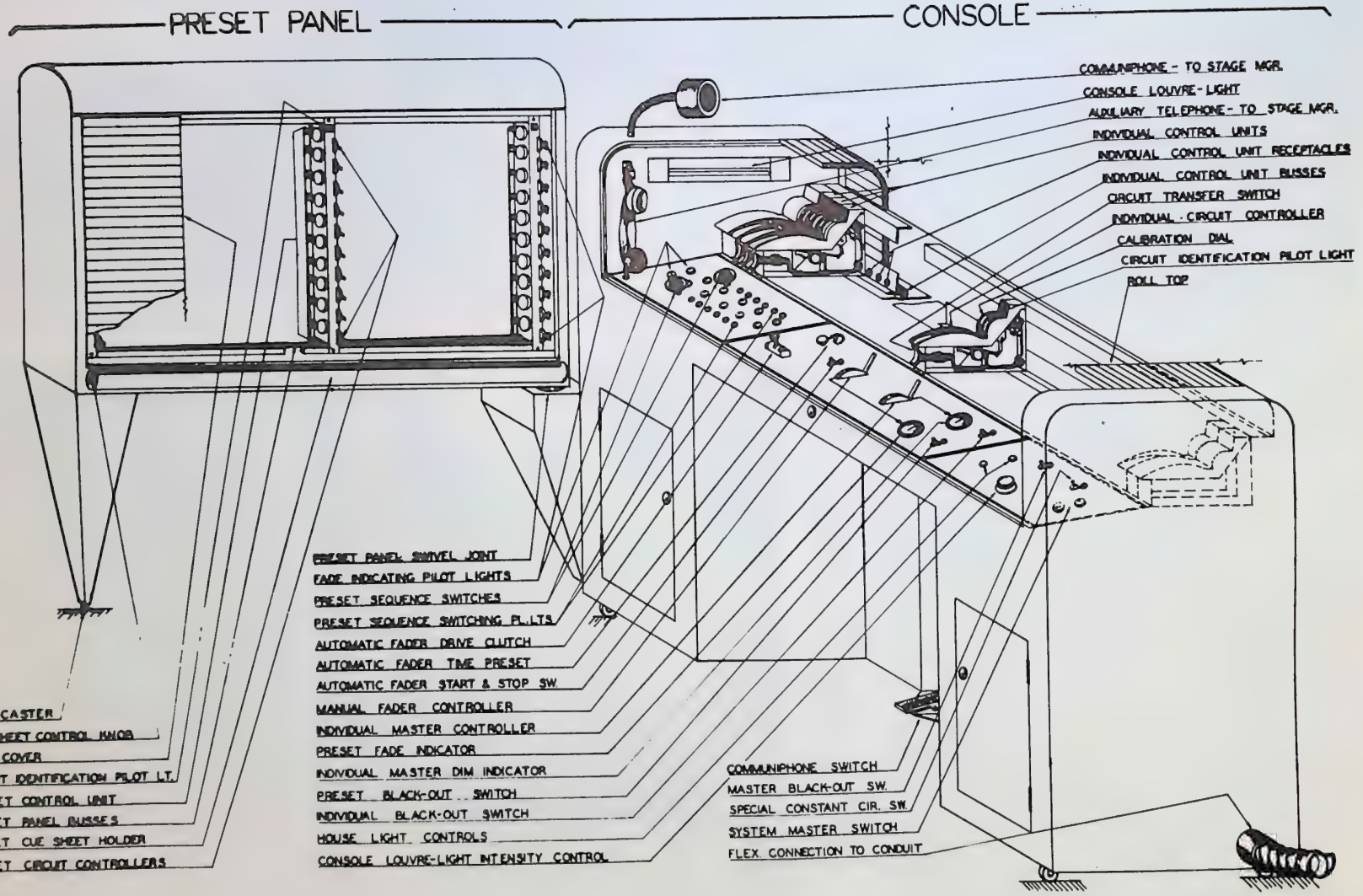


FIGURE 2—Diagram of the pre-set panel and console. (Compare with the photograph in Figure 1.) In the pre-set panel are found circuit controllers, cue-sheet holder, panel busses, control unit, identification pilot light, roll cover, cue-sheet control knob, ball caster, and pre-set panel swivel joint. In the console are found fade-indicating pilot lights, pre-set sequence switches and pilot lights, automatic fader drive clutch, automatic fader time pre-set, automatic fader start-and-stop switch, manual fader controller, individual master controller, pre-set fade indicator, individual master dim indicator, pre-set black-out switch, individual black-out switch house-light controls, console louver light intensity control, communiphone to stage manager, console louver light, auxiliary telephone to stage manager, individual control units, individual control unit receptacles, individual control unit busses, circuit transfer switch, individual circuit controller, calibration dial, circuit identification pilot light, roll top, communiphone switch, master black-out switch, special constant circuit switch, system master switch, and flexible connection to conduit. The electronic system for the control of stage lighting sketched here is the result of a 4½-year development project and was demonstrated for the first time at the University Theatre of Yale University, where it remains as a permanent installation. It represents the first full-scale attempt to control stage lighting by means which are entirely electronic. The system is based on the use of the high-current, inert-gas-filled thyratron tube, used both as a contactor and dimmer. All functions of both switching and dimming are accomplished by a single network which is remotely controlled and comprises two main elements: console with pre-set panel and tube bank.

by 26 by 6 inches, and contain therein the following items.

Forty-four individual control units, each wired complete in itself and terminated in a male plug which, when plugged into the individual unit receptacles, make up what is called the manual.

Each of the individual control units is made up of the following components.

(1) A separately illuminated, circuit identification pilot light.

(2) An individually-operated, finger-actuated circuit controller, operating through an arc of 1½ inches from "off" to "on." This control is linked mechanically by a quadrant and pinion to drive a 1-watt, wire-wound potentiometer.

(3) A mechanically operated, rear illuminated, full-vision calibration dial, which is lever-linked to the individual circuit controller.

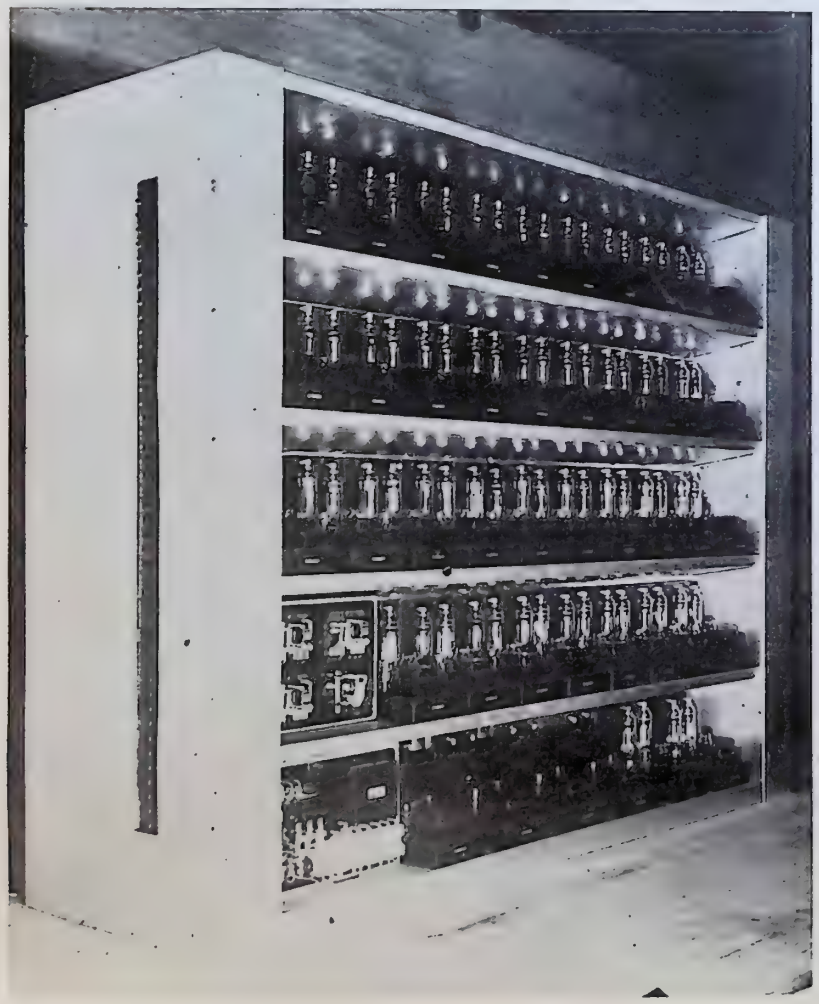
(4) A three-position, cam-operated circuit transfer switch, with a tip table control surface which in appearance and operation is similar to the stop-switching control of a pipe-organ console. This switch serves the purpose of determining the type of operation of its particular circuit. In the up-throw position, the individual potentiometer controls the circuit, in the down-throw position the pre-set potentiometers affect the control, and the neutral position is "off." The block diagram, Figure 5, shows that the individual and pre-set controls form two parallel circuits, either of which can energize the separate control circuits of the system. This control can be either circuit-by-circuit or in concert by means of the manual master controller or the master fader controller.

Forty-four pre-set panel control units wired as a group and plugged into the left side of the console by means of a multipole plug. Each separate unit is composed of the following.

(1) An illuminated circuit identification pilot light.

(2) Ten pre-set controllers each individually operated and calibrated to conform to the manual controller, so that intensity readings can be transferred from one to the other. These controllers are each quadrant and pinion linked to potentiometers identical to those in the individual control units.

FIGURE 3—The tube bank contains the following items: a breaker-distributing panel, a terminal strip, a transformer network, the primary power contactor, the master fader, thirty-eight 1.5-kw. and six 6-kw. switching and dimming units, booster transformer network and secondary power contactor, and the individual circuit control busses. A schematic drawing of the tube bank is shown in Figure 4.



The master controls are also pre-wired and plugged into the console master wiring gutter and consist of the following components.

(1) A pre-set sequence switching system is provided in the two rotary, multipole, six-position switches. The first five positions permit the pre-set groups to be switched in any sequence from odd- to even-numbered or vice versa onto or from the fader. The sixth position makes a dim-out or a dim-up possible from either end of the fader, thereby eliminating the need for a group of pre-sets on each switch to be set at zero for this purpose. Also operated by these switches are two groups of pilot lights, one group the pre-set switching pilot lights which designate in a glance what the fading sequence shall be; the second group designates when a fade has been completed and into what pre-set group the control has been transferred. These pilot lights are duplicated in the pre-set panel.

(2) A fader manually or automatically operated which fades proportionally from odd-numbered to even-numbered pre-set groups, or vice versa, with some circuits possible dimming up while others are dimming down. That is, the fader functions the same in either direction and is independent of the number of circuits being used in pre-set at any one time. The fader unit consists of a transformer network the variable element of which is the movable contact on a small variable auto-transformer. For fades lasting longer than 2 seconds, an automatic drive has been devised which consists of a d.c. shunt-wound motor connected by a gear train to a sender-synchro and speed controlled by an amplifier. To eliminate the noise of the gear train, these units are situated in the tube bank (installed in the basement) and the fader unit located in the console is driven by means of a receiver synchro. The speed of the motor drive is controlled by the automatic fader time pre-set potentiometer situated in the console which is continuously variable from 2 seconds to 4½ minutes. When it is desired to use the fader manually, a friction clutch disengages the receiver-synchro from the fader and then the motor control amplifier and drive tracks each movement of the fader. This is accomplished by means of an interlocking relay and limit switch system. An automatic fade cycle is begun by the momentary depressing of the starter switch to the start position, and when released to neutral or run position, the fader operates at the pre-set speed until the cycle is complete, at which time it automatically shuts off, or the starter switch is thrown to the off position, which enables the fader to be stopped at any desired position during the cycle. Thus, light changes of extreme complication can be handled smoothly by a few controls.

(3) An electrical master manually operated which furnishes proportional master control to all those circuits which at any one time are being operated by their individual circuit controllers is provided. This control consists of a chain-driven variable auto-transformer of the same type used in the fader.

(4) The action of both master controls is monitored by their respective fade and dim indicators, and separate

black-out switches allow for a black-out to occur on either master circuit with no effect on the other. These master controls are shown in detail in Figure 6.

(5) To the right of the master control panel is the auxiliary control panel consisting of the following: (a) Momentary house light control for dimming house lights at a fixed speed; (b) an auto-transformer console louvre-light control; (c) a master black-out switch for blacking out the entire system; (d) a special constant circuit switch which operates a 15-amp. relay situated in the tube bank for the purpose of controlling special effects motors and so forth; and (e) a system master lock switch which cycles the closing of the primary and secondary power contactors to allow for a pre-heating time of 50 seconds for the tube filaments to reach operating temperature before application of the anode voltage.

The Tube Bank

The tube bank measures 9 by 7 by 3 feet, and contains the following items.

A **breaker-distributing panel** situated at one end and connected to the individual receptacles in the wiring gutters into which are plugged the 44 electronic switching and dimming units.

A **terminal strip** situated at the opposite end of the tube bank where are terminated 44 pairs of No. 22 wire which carry the pilot voltage from the control elements in the console to their counterparts in the tube bank. The other end of these wires are terminated in receptacles mounted within the control gutters into which are plugged the control plugs of the electronic switching and dimming units.

A **transformer network** which furnishes 18 volts of pilot voltage to the console and across which all pilot controls operate.

The primary power contactor which furnishes power to the tube filament transformer primaries which are situated in each individual electronic switching and dimming unit.

The master fader automatic drive mechanism and control amplifier (previously described).

Thirty-eight 1.5-kw. electronic switching and dimming units each complete in itself and containing one high vacuum tube and two inert-gas thyratrons which, being connected back to back, control both half-cycles of the a.c. input.

Six 6-kw. electronic switching and dimming units the control side of which are plugged into the gutters as shown. In addition, each contains an auxiliary transformer which is permanently connected to it through the anode and load gutter receptacles. The tube complement is the same as for the 1.5-kw. circuits. Each of the units also contains a single circuit adjustment which is to compensate for differences in, and aging of the circuit components. This is effected with a screw driver upon installation and about every 1,000 hours thereafter. An experimental unit has been observed in continuous operation for 5,000 hours with only minute changes in the dimming curve and no structural or component breakdowns have occurred There is every reason to believe that these units will operate satisfactorily for a period of time in excess of 10,000 hours before tube replacement should be necessary. In

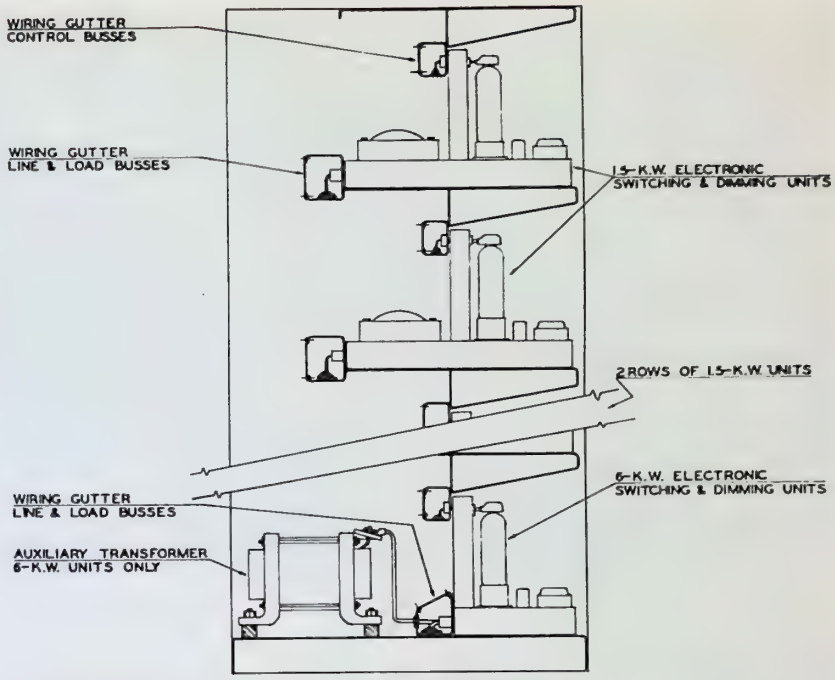
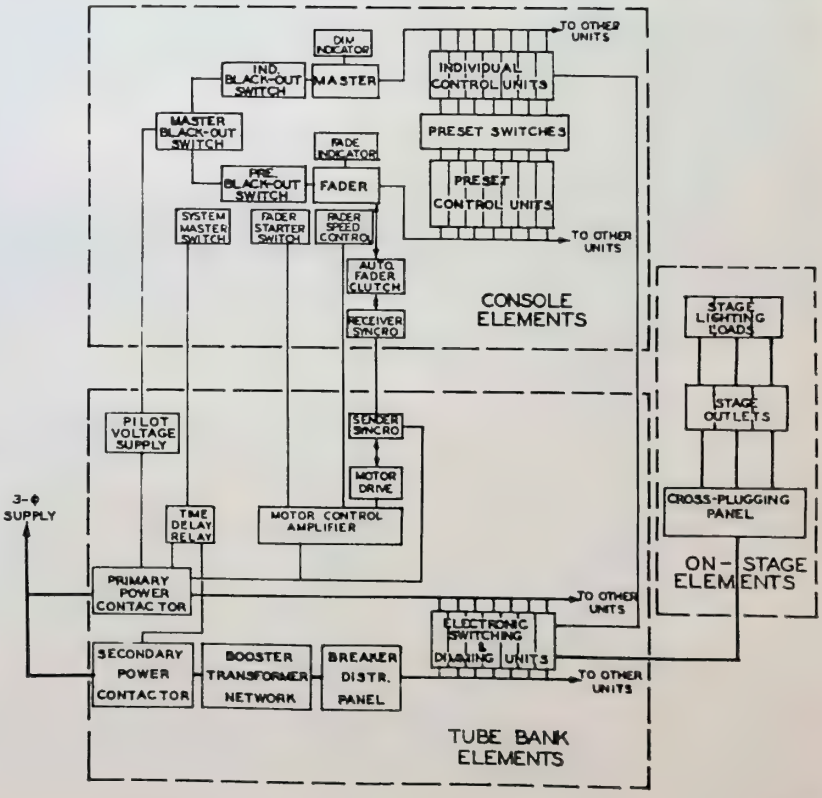


FIGURE 4—Schematic drawing of the tube bank shows the location of the wiring gutter with the control busses, the wiring gutter with the line and load busses, the auxiliary transformer for the 6-kw. units only, the 1.5-kw. electronic switching and dimming units, and the 6-kw. electronic switching and dimming units. This schematic drawing should be compared with the picture (Figure 3) of the tube bank.

FIGURE 5—Block diagram of the system shows the relation of the console elements (see also Figures 1 and 2), the tube bank elements (see also Figures 3 and 4), and the on-stage elements, consisting of the stage-lighting loads, the stage outlets, and the cross-plugging panel. The system is unitized and is demountable unit-by-unit and control-by-control from master rack and console, respectively.



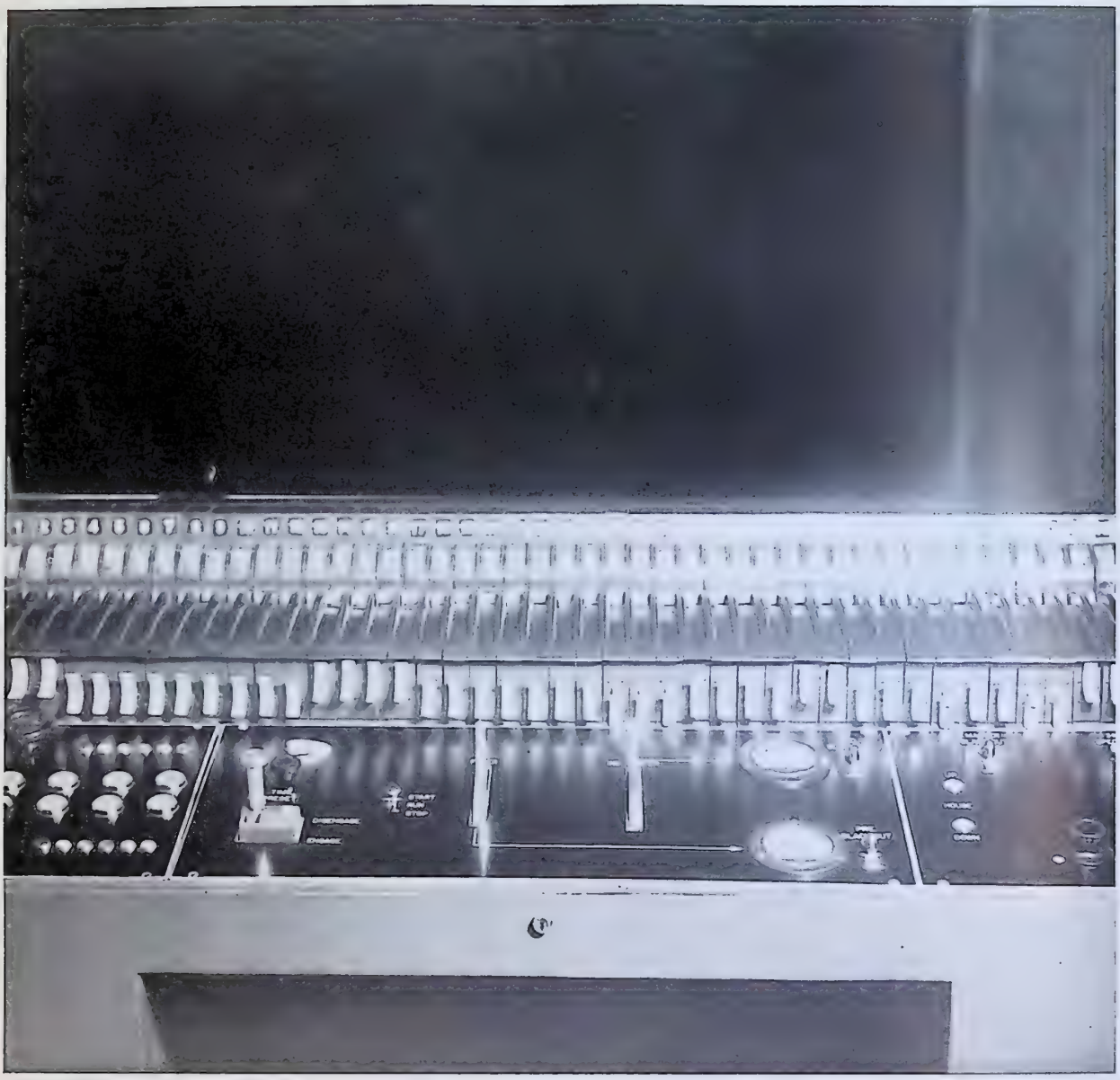


FIGURE 6—Details of the master controls. These controls are also pre-wired and plugged into the console master wiring gutter and consist of the following components: (1) a pre-set sequence switching system, (2) a fader automatically or manually operated, (3) an electrical master manually operated, and (4) a fade and dim monitoring arrangement. There are 44 individual control units, each wired complete in itself and terminated in a male plug which, when plugged into the individual unit receptacles, make up what is called the manual, operated similary to organ stops.

theatre time, this response represents a period of about 10 years.

A **booster transformer network and secondary power contactor** are also installed in the tube bank room. They are enclosed by an expanded metal cage which also contains the main-line fuses. This network consists of auto-transformers connected in double star across three single phases each at 220 volts, with their center taps grounded to the solid neutral of the system. The boosted secondary voltage across each half of each phase is 132 volts measured to the neutral.

The individual circuit control busses, which extend from the tube bank to the stage, terminate in the stage circuit cross connecting panel at which panel stage lighting load outlets can be patched in any combination for the operation of a particular show.

Other Details

In this installation (Figure 7), the console pre-set panel is installed in the back of the auditorium, in a former projection booth. This room was modified by the installation, across the front, of a sloping glass viewing port making the room practically sound-proof. The tube bank is placed in a room under the stage, about 30 feet from the stage cross-connecting panel.

This console system can be either a one-man or a two-man operation, depending upon the number of light changes in a given production. If one man is to operate, the pre-set panel is swiveled to a position at right angles to the operating face of the console, thereby allowing the single operator to reach all controls. If two men are to operate, the pre-set panel is swiveled to the in-line position so that one man may operate the console and the second man the pre-set panel.

Loading variations as great as 20:1 can be accommodated without noticeable variation in the dimming curve. Figure 8 shows graphically the dimming curve variation of a loading ration of 7.5:1 which is an average ratio. The dimming curve closely approximates linearity

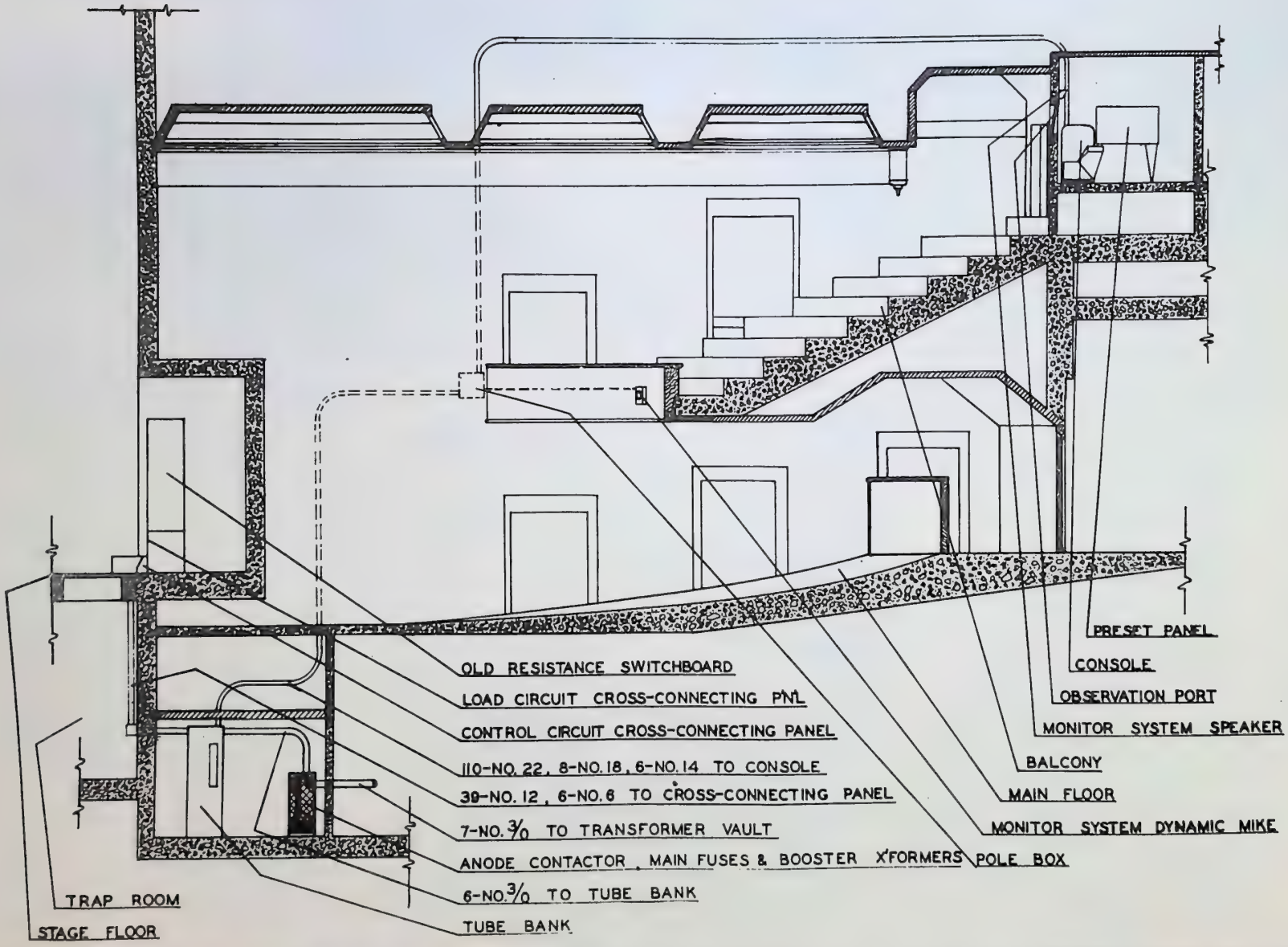


FIGURE 7—Diagram of the University Theatre installation. The console pre-set panel is installed in a former projection room at the back of the auditorium. The room was modified by the installation, across the front, of a sloping glass viewing port making port making the room practically sound-proof. The tube bank is placed in a room under the stage, about 30 feet from the stage cross-connecting panel. This console system can be either a one-man or a two-man operation. If one man is to operate, the pre-set panel is swiveled to a position at right angles to the operating face of the console, thereby allowing the single operator to reach all the controls. If two men are to operate, the pre-set panel is swiveled to the in-line position so that one man may operate the console and the second man the pre-set panel.

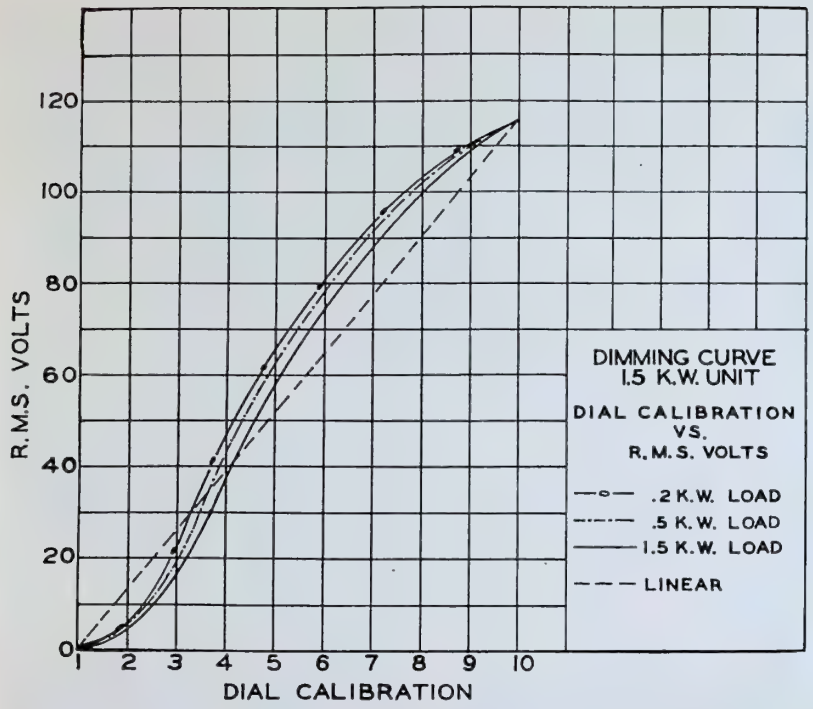
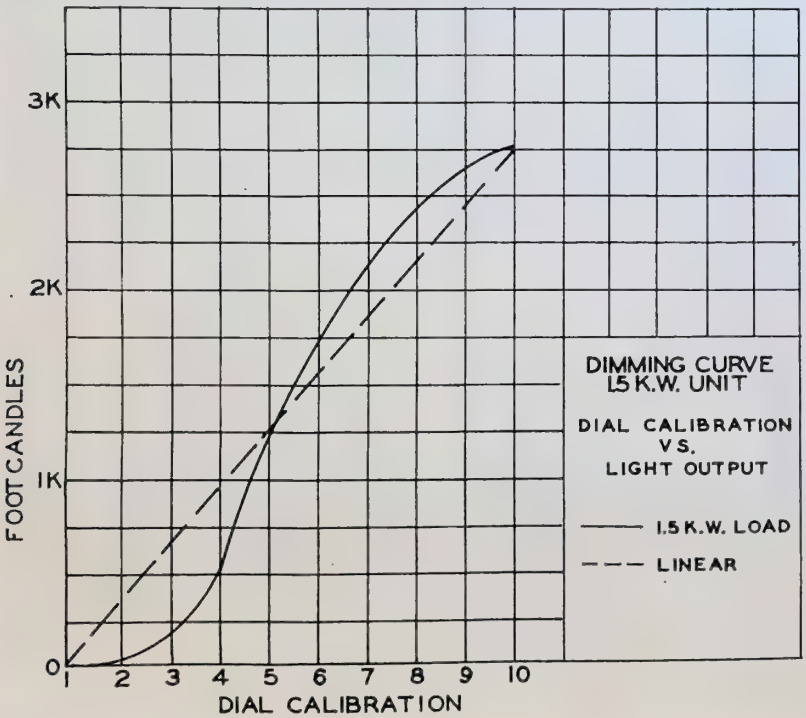


FIGURE 8—Dimming curve of the 1.5-kw. unit. The dimming curve closely approached linearity with with ratio of change between 1 and 3 and between 8 and 10 than in the middle area, showing that, with proper compensation, absolute linearity can be achieved. The graph shows the relation between the dial calibration and r.m.s. volts, for loads of 0.2, 0.5, and 1.5 kw. The linear curve is given.

FIGURE 9—Dimming curve of the 1.5-kw. unit, showing the light output in foot candles plotted against the dial calibration. The light output curve of a 1.5-kw. lamp is similar to the 1.5-kw. voltage curve shown in Figure 8. The average anode efficiency of the individual circuits is 90 percent and the overall efficiency 87 percent. The console operates on 80 watts, exclusive of the pilot lights.



with a slower ratio of change between 1 and 3 and between 8 and 10 than in the middle area, showing that, with proper compensation, absolute linearity could be achieved. Figure 9 shows the light output curve of a 1.5-kw. lamp to be similar in slope to the 1.5-kw. load voltage curve of Figure 8.

The average anode efficiency of the individual circuits is 90 percent and the over-all efficiency 87 percent. The entire console operates on 80 watts exclusive of pilot lights.

As a means of communication with the stage during rehearsals and performances, two communication systems are provided. A reversible amplifier channel controlled by a foot switch on the console is normally in the listen position from the stage, thereby allowing the operator to talk to the stage without the use of his hands. Should this system fail, a cradle telephone system is provided. The show is heard in the console room by a separate amplifying system with dynamic microphones installed on the balcony rail and with the speaker output hung on the wall in front of the operator.

SUMMARY

This electronic console control system provides all the qualifications essential to a modern system of intensity control, namely:

(1) Flexibility, ease, and convenience of operation. The individual circuits are subject to a wide loading ratio, the dimming curve is essentially linear and proportional mastering and fading are accomplished. The controls are all operated easily with little effort on the part of the operator and the nature of the tube grid circuits enable the logical grouping of the controls for convenience of operation as well as the situation of the control desk at a point of vantage in front of the stage where the operator can both see and hear.

(2) Adaptability to all types of theatre buildings and productions. Since this system is unitized, it can be made to fit either a university theatre or an opera house.

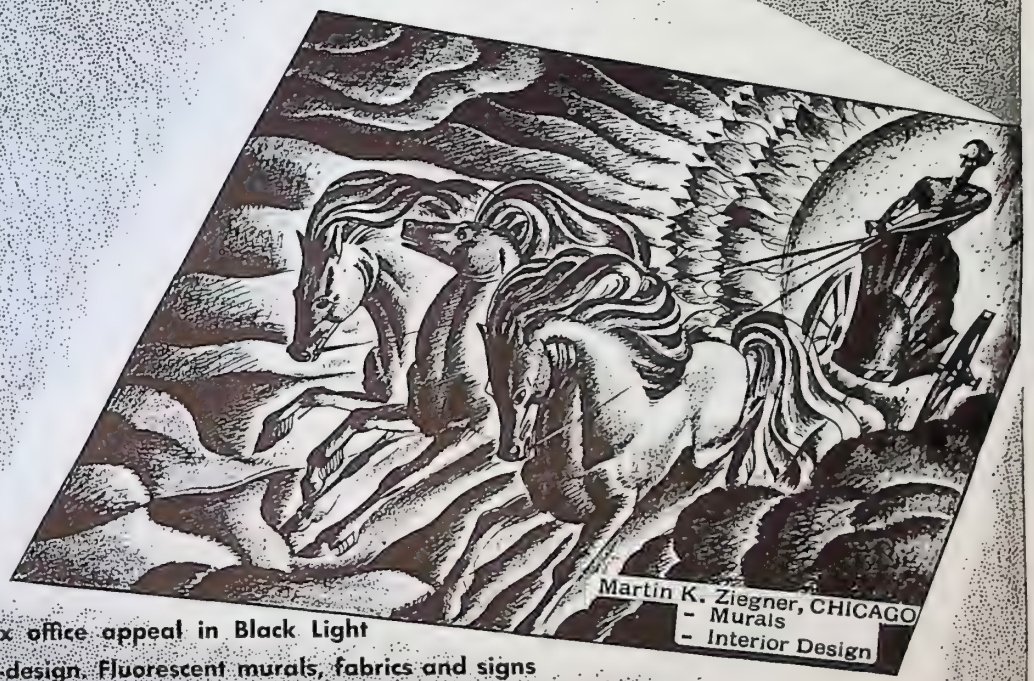
(3) An initial cost commensurate with the theatre's ability to pay, and means provided for the progressive purchase and installation of the separate components of the system thereby allowing enlargement within a pre-determined master framework without addition to the original construction. This is the first system of intensity control to embody a single network control of both switching and dimming by means of a single element and fulfills a long-felt need for an efficient system of plug-in units where amplifiers and controls are wired complete at the factory and can be plugged into master pre-wired racks and control console.

(4) A reasonably low cost of maintenance is ensured by unitizing.

(5) Efficiency of operation. This is assured due to the fact that efficiency is a primary quality of the thyratron tube.

This electronic console system can be quickly summarized as an efficient single network system at reasonable cost, unitized, and standardized so as to make progressive purchase possible and incorporating the above-mentioned operational advantages.

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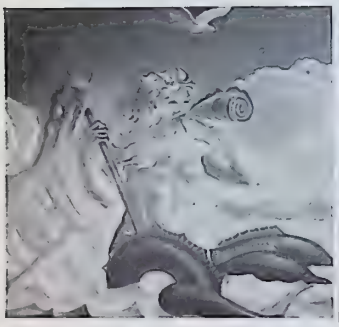
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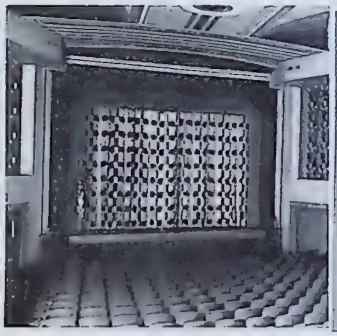
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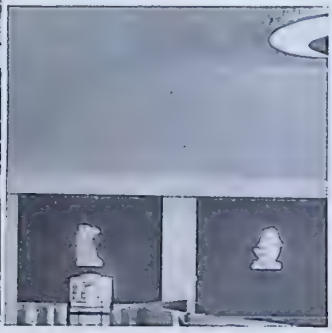
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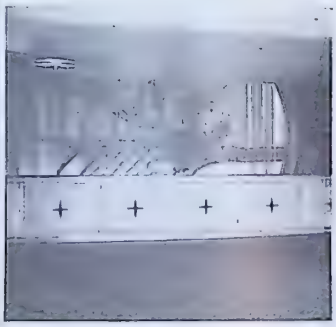
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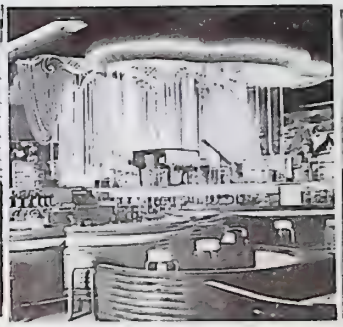
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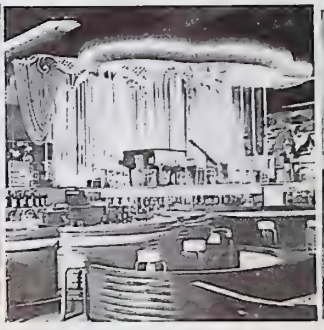
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INTELLIGENTLY SERVING THE THEATRE INDUSTRY FOR OVER TWENTY-NINE YEARS

• Stage and Auditorium Draperies • and All Other Fine Decoration

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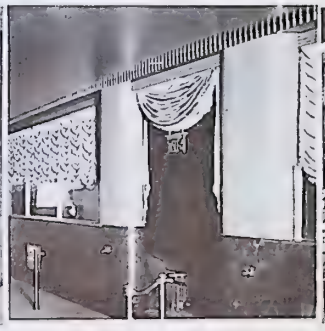
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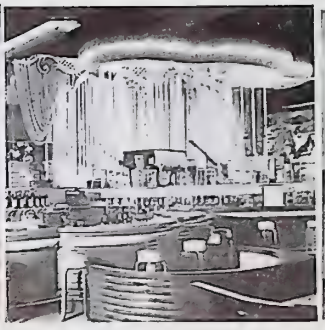
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Our vast experience of almost thirty years, and many noteworthy installations all over the world, together with an alert and progressive staff, is a sure guarantee of creating distinctive and individual effects in the solution of your problem.

We can make your theatre radiate beauty and loveliness, rather than present a four walled boxed-in auditorium.

The interior of your theatre can accelerate box-office receipts and our crack technicians have the "know how" to make it so.

Send us the blueprints or complete measurements and we will develop ideas and layouts for your consideration.

If not too far away, a trained decorator will call to see you. Write or wire us.

ANYWHERE IN THE EAST—*Mail this card!*

INTELLIGENTLY SERVING THE THEATRE INDUSTRY FOR OVER TWENTY-NINE YEARS

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....and all in 6 short months



Six months ago David E. Brodsky, one of the foremost theatre decorators in the East, formed his own firm of decorators. Mr. Brodsky surrounded himself with expert mechanics and craftsmen, all with many years' experience in theatre decoration, and opened for business without one single "job" on the books.

Now, as this is being written, it is just six short months since this new firm was organized and this list of installations completed in that time, tells its own success story.

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★ ★ ★

DAVID E. BRODSKY

ASSOCIATES

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Consult Greiwe on any decorating plans . . . outstanding artists are at your service . . . color photos of theatres recently decorated will be shown on request. Write . . . wire or phone.

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- Carpeting—draperies
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- Fabric wall covering

Inquiries are especially invited from theatres in Ohio, Indiana, Illinois, Michigan, Wisconsin, Kentucky, Pennsylvania, West Virginia and Tennessee.

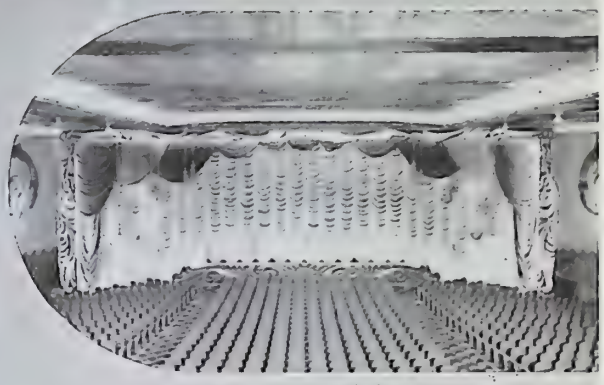
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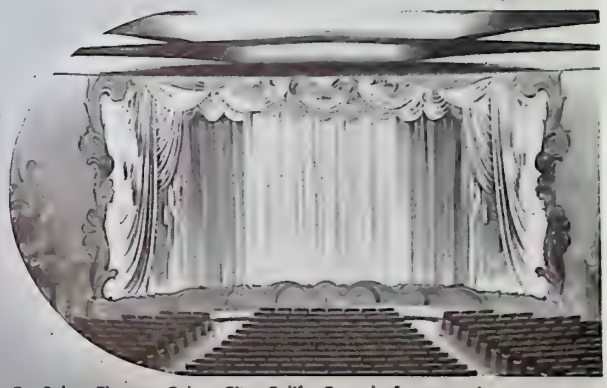
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Whether you be an independent neighborhood theatre owner or the president of a chain of theatres, Grosh & Sons has a complete understanding of "how to obtain the most for your budget dollar."

Services available for: Legitimate theatres, Motion-picture theatres, Supper clubs, Road shows, School stages, and Expositions.

25 years of experience in designing, manufacturing and installing draperies have prepared us with the necessary solutions for any job ranging from the simplest to the most difficult.

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Many years ago, we, at Knoxville, decided to devote all of our efforts and talents to the creation of interiors that "sparkle" with artistic atmosphere. Now, years of experience and hundreds of successfully executed jobs later, we feel that we are not exceeding the bounds of modesty when we call ourselves... specialists.

Bring us your problem... no matter how difficult it may be... and let our staff of theatrical display experts solve it for you. There's no obligation whatsoever on your part.

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LENOX, Philadelphia, Pa.
AMBASSADOR, Philadelphia, Pa.
LINCOLN, Washington, D. C.
COLONIAL, Phoenixville, Pa.
APOLLO, Baltimore, Md.
TOWN, Baltimore, Md.
CAPITOL, Baltimore, Md.
JEWELL, Washington, D. C.
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APEX, Washington, D. C.
MET, Baltimore, Md.
GREEN HILL, Philadelphia, Pa.
REX, Norfolk, Va.
LYRIC, Philadelphia, Pa.
LYRIC, Chester, Pa.
TOWSON, Towson, Md.
PALACE, Quakertown, Pa.
ARGONNE, Belair, Md.
ELTON, Steelton, Pa.
DRUID, Damascus, Md.
BEACH, Virginia Beach, Va.
HAVERFORD, Philadelphia, Pa.
GARDEN, Baltimore, Md.
LITTLE, Baltimore, Md.
LEE, Pennington Gap, Va.
VISTA, Altavista, Va.
NAYLOR, Washington, D. C.
SENATOR, Washington, D. C.
STATE, Greencastle, Pa.
STRAND, Wildwood, N. J.
WINDSOR, Baltimore, Md.
CHESTER, Chestertown, Md.
VILLAGE, Washington, D. C.
STRAND, Deanwood, Md.
REEVES, Martinsville, Va.
LITITZ, Lititz, Pa.
RIO, Baltimore, Md.
DENTONIA, Denton, Md.
WATERSEDGE, Watersedge, Md.
BROAD, Souderton, Pa.
BYRD, Philadelphia, Pa.
NEW ESSEX, Essex, Md.
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NEW, Aberdeen, Md.
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. . . ABILITY

Twenty-four years' experience in decorating and designing theatre interiors offers you the expert knowledge and ability so necessary for your particular theatre.

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Being the only firm in the territory with our own drapery and painting shops, results not only in greater working efficiency and supervision, but also in better coordination of ideas which are only possible under one organization.

. . . IDEAS

Whether it's decorating a new theatre or modernizing an old one, Paramount is ever alert to changing trends, and constantly strives to create and develop ideas which have audience appeal, and are truly related to the requirements of each individual theatre and above all—

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Conscious of the constant rise in costs of labor and materials, Paramount has recently reorganized and streamlined its organization so that theatres can now be decorated in the most efficient and economical manner.

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A Complete Theatre Decorating Service

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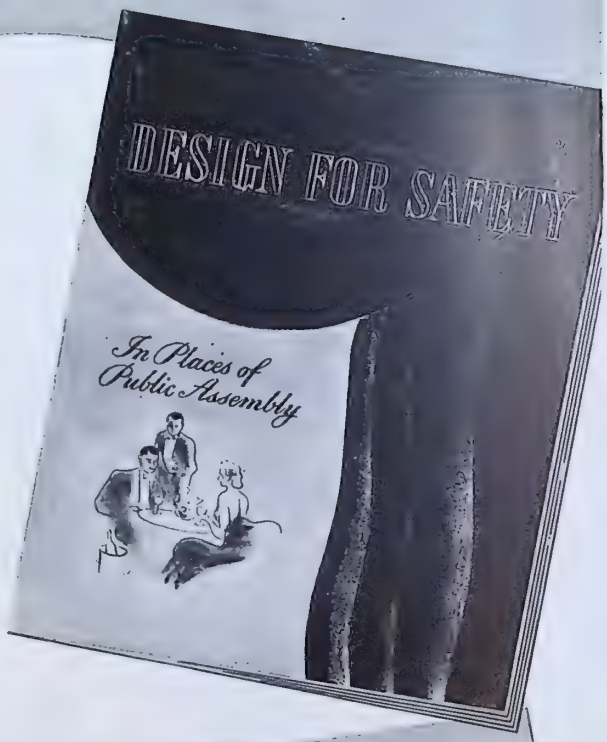
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In carrying forward the Peter Clark tradition of the best in theatrical and stage equipment—equipment that operates with high efficiency through the years—JOSEPH VASCONCELLOS, INC., has been manufacturing similarly fine equipment since the Company's organization in 1937.

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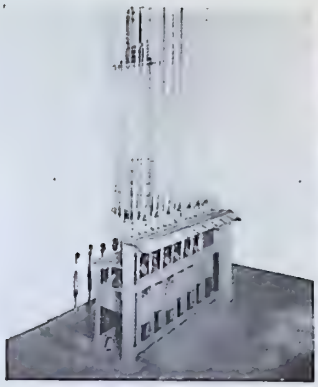
• *Theatre Equipment*

- Asbestos Curtain and Rigging
- Soundproof Fire Curtain
- Theatre Rigging
- Counterweight System
- Portable Stage Equipment
- Draw Curtain Tracks
- Stage Draperies
- Hand and Electric Microphone Lifts
- Mechanical Stage Effects
- Movable Band Cars and Stages
- Lifts for:
  - Organ Console
  - Orchestra
  - Stage
- Projection Room Shutters
- Roll-up Picture Screen
- Movietone Horn Trucks and Rigging

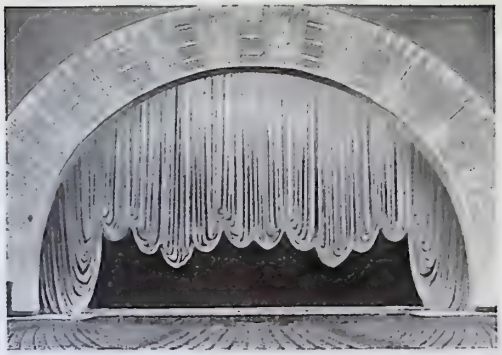
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- Revolving Turntables
- Window Display Turntables
- Outdoor Advertising Displays

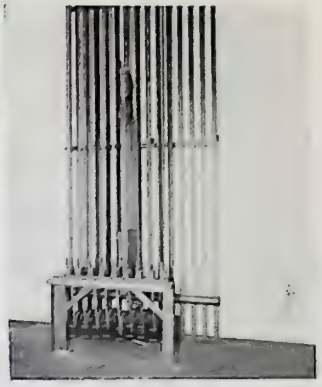
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Close Up of Wire Guide Counterweight System with Locking Rail



Contour Curtain . . . Radio City Music Hall . . . New York



Close Up of T—Track Counterweight System with Locking Rail

Curtain Track

Draw curtain tracks manually or electrically operated. Noiseless steel track, heavy duty, with pipe truss at top, ball bearing curtain carriers with swivel attachment, pulley blocks adequately guarded.

Asbestos Curtains

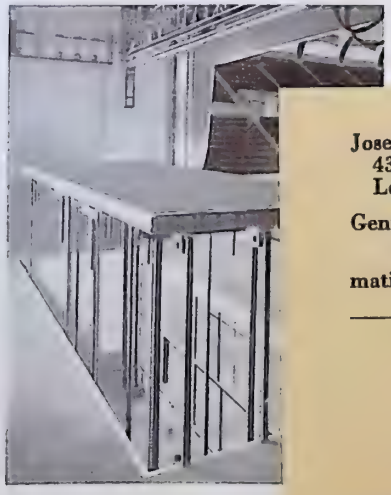
Rigid asbestos fire curtain with asbestos cloth on both sides of steel frame, flexible asbestos fire curtains, roll-up asbestos fire curtains — all fire curtains equipped with automatic release line for descending under their own weight.

Orchestra and Stage Lifts

An orchestra, organ console or stage lift consists of one or more jackscrews, raised and lowered by worm-geared operating machinery driven by an electric motor. Each lift to have manually operated push-button stations. All machinery mounted on vibration-absorbing construction.

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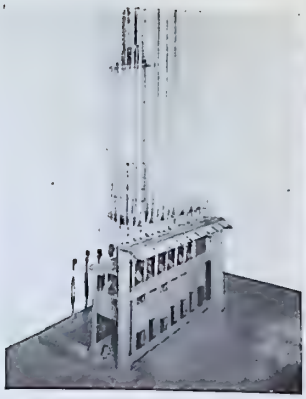
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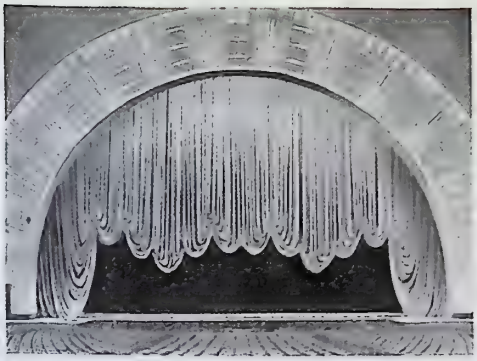
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Signed_____

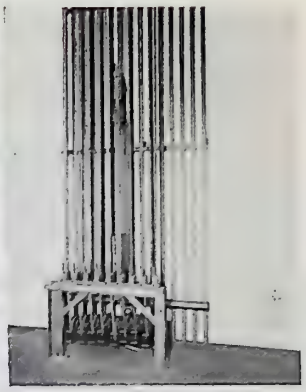
INC., 43-15 DUTCHKILLS STREET LONG ISLAND CITY 1, NEW YORK



Close Up of Wire Guide Counterweight System with Locking Rail



Contour Curtain . . . Radio City Music Hall . . . New York



Close Up of T—Track Counterweight System with Locking Rail

Curtain Track

Draw curtain tracks manually or electrically operated. Noiseless steel track, heavy duty, with pipe truss at top, ball bearing curtain carriers with swivel attachment, pulley blocks adequately guarded.

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Rigid asbestos fire curtain with asbestos cloth on both sides of steel frame, flexible asbestos fire curtains, roll-up asbestos fire curtains — all fire curtains equipped with automatic release line for descending under their own weight.

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Portable or permanent soundproof broadcasting booths. Special or custom built. Portable projection booth, port-hole shutters for moving picture booth with fire release mechanism.

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Complete line of stage rigging and hardware including tee bar and wire guide system; stage accessories of every size and nature. In addition, we make movietone mono-rails, movable and adjustable horn trucks, and every other item of equipment required for the stage.

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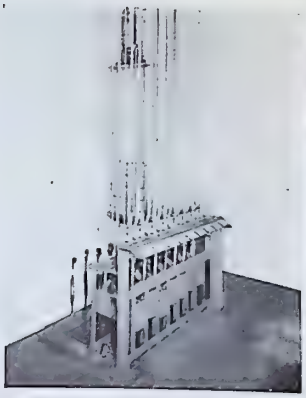
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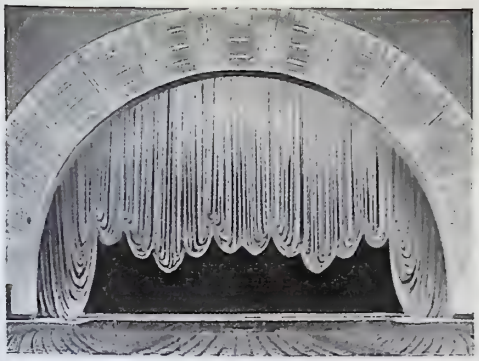
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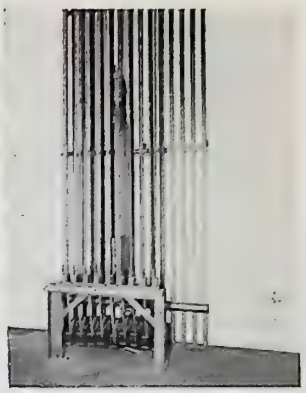
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Contour Curtain . . . Radio City Music Hall . . . New York



Close Up of T—Track Counterweight System with Locking Rail

Curtain Track

Draw curtain tracks manually or electrically operated. Noiseless steel track, heavy duty, with pipe truss at top, ball bearing curtain carriers with swivel attachment, pulley blocks adequately guarded.

Asbestos Curtains

Rigid asbestos fire curtain with asbestos cloth on both sides of steel frame, flexible asbestos fire curtains, roll-up asbestos fire curtains — all fire curtains equipped with automatic release line for descending under their own weight.

Orchestra and Stage Lifts

An orchestra, organ console or stage lift consists of one or more jackscrews, raised and lowered by worm-geared operating machinery driven by an electric motor. Each lift to have manually operated push-button stations. All machinery mounted on vibration-absorbing construction.

Broadcasting Booths

Portable or permanent soundproof broadcasting booths. Special or custom built. Portable projection booth, port-hole shutters for moving picture booth with fire release mechanism.

Counterweight System

Complete line of stage rigging and hardware including tee bar and wire guide system; stage accessories of every size and nature. In addition, we make movietone mono-rails, movable and adjustable horn trucks, and every other item of equipment required for the stage.

Mechanical Equipment

We manufacture and install all types of mechanical display built to fit special requirements, no limit as to size and capacity. Motor operated horizontal positioners, manually operated vertical turners, motor operated triangular prisms, water falls effects, motor operated stainless steel panel shutters curved or flat; electrically or manually operated steel and wood traveling platform.

Turntables

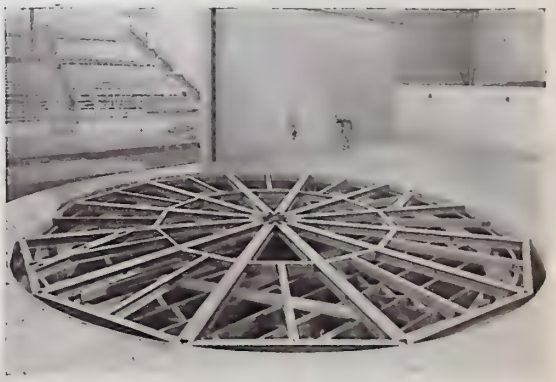
We design, fabricate and install turntables for stage, dance floor, window display; automobile and bus turntables; no limit as to size or capacity. All turntables and equipment built to fit the special requirements of each job.

Services

Our facilities are at the service of architects or the owners in the development of plans, giving special attention to modern requirements for stage and gridiron designs. Our services include layouts, estimates and equipment specification without obligation.



Stage Elevators . . . Convention Hall . . . Philadelphia



25-ft. Diameter Turntable for Outdoor Stage Built Flush in Stage Floor. Electrically operated

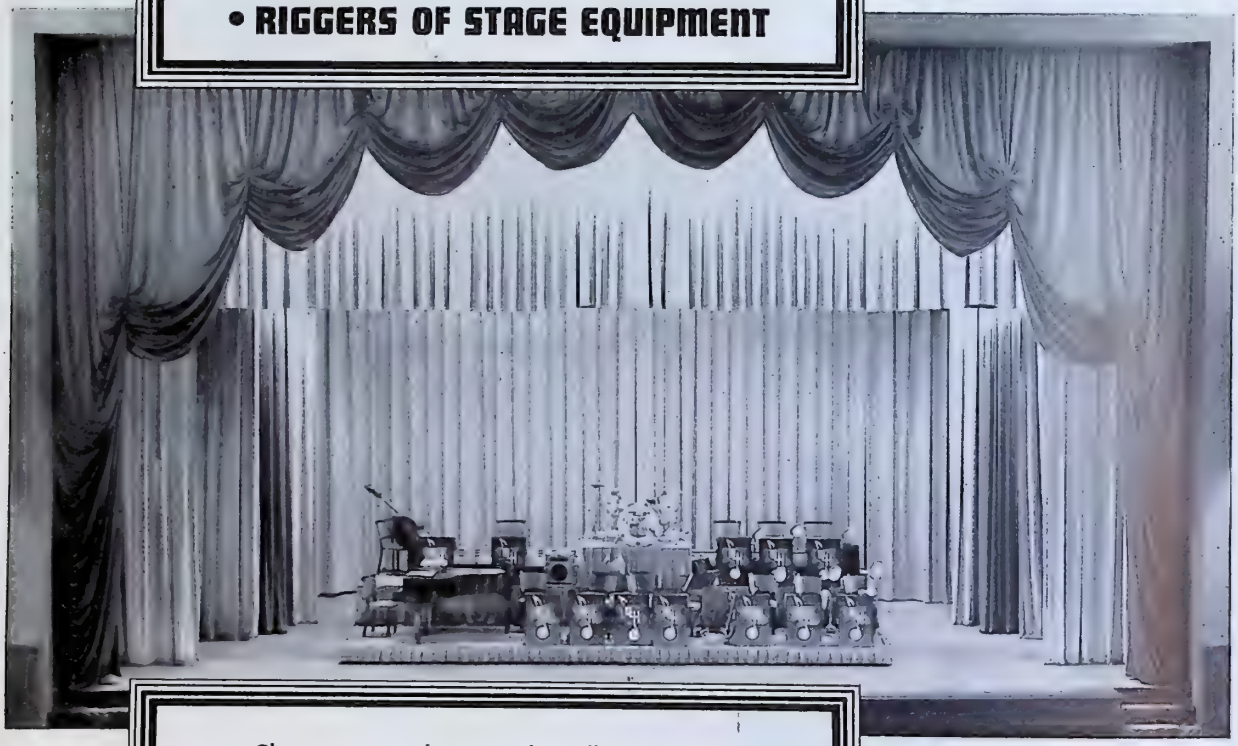
INC., 43-15 DUTCHKILLS STREET LONG ISLAND CITY 1, NEW YORK

J. R. CLANCY, Inc.

Stage Rigging...Scenery Hardware

• DESIGNERS • MANUFACTURERS
• RIGGERS OF STAGE EQUIPMENT

Installation showing Clancy Contour Curtain and Motorized Band Car. Car operates under own power. No guides required. Easily dismounted.



Clancy stages, large and small, are designed, equipped and installed on lines of functional efficiency . . . complete, flexible, dependable and safe. Every detail is carefully planned and proven before installation. Equipment and hardware are specially manufactured to specification.

Only Clancy offers you the advantage of one contract, one contractor and one complete service, backed by a complete guarantee.

Perhaps you are not familiar with how far Clancy has gone in creating new and improved equipment for greater stage efficiency . . . equipment that means savings in initial cost and in maintenance cost to you.

May we introduce you to the possibilities of a truly modern stage — and help you plan for yours? Simply write — there's no obligation.

- *Television Studio Equipment*
- *Asbestos Curtains*
- *Clancy Contour Curtains*
- *Olio and Painted Drops*
- *Cycloramas*
- *Auditorium Drapes*
- *Interior Flats*
- *Curtain Tracks and Controls*
- *Console and Orchestra Lifts*
- *Wagon and Revolving Stages*
- *Picture Screens*
- *Counterweight Equipment*
- *Lighting Equipment*
- *Bull Wheels*
- *Magnascopes*
- *Electric Winches*
- *Motor Controls*
- *Traction Drive Equipment*
- *Sound Horn Trucks and Cradles*
- *Flying Microphones*

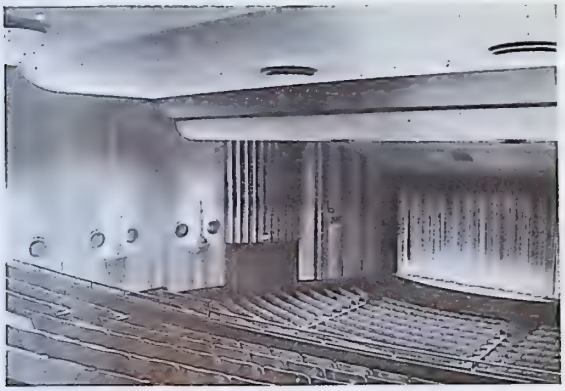
J. R. CLANCY INC.
1000 W. Belden Ave.
SYRACUSE 4, N. Y.

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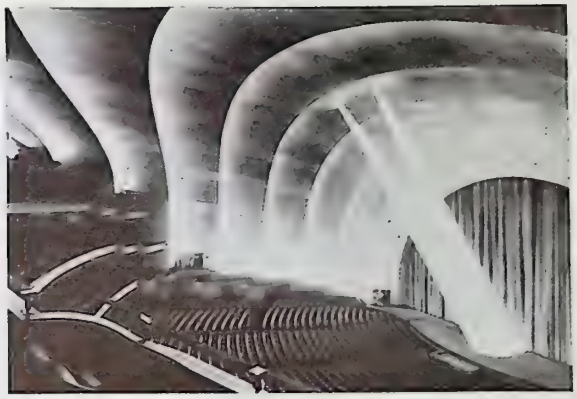
KLIEGL LIGHTING

...for Modernization of Your Theatre

It pays to install the latest Kliegl lighting equipment when building new theatres or remodel existing structures. Improved designs and unique features secure decided advantages. Obsolete equipment lowers efficiency of operations and favors competition. Box office returns justify the use of Kliegl modern lighting methods and equipment.



Downlighting of this auditorium is accomplished with Kliegl units concealed above ceiling, providing unobstrusive uniform illumination throughout with comfortable viewing of the screen.



Stage and auditorium lighting of Radio City Music Hall is the most elaborate system anywhere to be found. Modern in every respect it was furnished entirely by Kliegl Bros.

Functional requirements properly considered in relation to the characteristics of various lighting devices govern the selection of Kliegl equipment. Intelligent application of light is the secret of good illumination and satisfactory installations. The great variety of Kliegl devices insures a solution to any lighting problem.

DOWNLIGHTS

For general lighting of auditoriums and spacious rooms with high ceilings. Fixed and adjustable beam types, for concealment above ceiling, projecting their light through a small aperture. Also angular types for front lighting of stage.

FLUSH FIXTURES

Inbuilt units or strips for direct illumination or decorative applications. Various designs and sizes in Fresnel lens type ceiling fixtures and fluorescent or incandescent extended fixtures of desired arrangements.

COVE STRIPS

Continuous channel or reflector strips for installation in coves and other structural recesses to provide indirect illumination. Incandescent, fluorescent or slimline types in various designs for different requirements. Made in any length or curvature.

EXIT LIGHTS

Made in conformance with fire regulations. Flush wall, surface and other types. Plain and ornamental designs with stenciled or etched lettering to harmonize with architectural style.

SPOTLIGHTS

Theatrical spotlights of all types and sizes can be furnished—either carbon-arc type or for incandescent lamps; Fresnel or plano-convex lenses; for long or short range projection. Also, balcony front spots with remote control color frames; and all-duty spotlights with inbuilt accessories for stage lighting from the projection booth.

FLOODLIGHTS

Exterior, interior and stage types for lighting the building front, lobby displays, or stage productions. All standard sizes and designs are available in all three types of floodlighting units.

POSTER LIGHTS

For attractive illumination of display frames or similar theatre announcements. Standard or special fluorescent strips and other forms of lighting supplied to suit requirements.

WALK LIGHTS

Enable patrons to safely find their way about in darkened auditoriums. Cast subdued light downward on steps and aisleways. Various types available for end-seat mounting, for stair risers, and for side walls.

FOOTLIGHTS

Complete range of designs are made from single row open trough reflector type footlight for a small stage to the double-row high wattage type individual reflectors and color roundels used in the largest theatres. Disappearing types are also available and made in several different designs.

BORDERLIGHTS

All standard types and sizes, and special designs, can be supplied—in continuous lengths or in sections as required, with or without work lights, wired for color control in any required number of circuits.

CYCLORAMA LIGHTS

Designed to evenly light the stage backdrop from the shortest distance possible. Straight or curved to conform with the cyclorama. Wired for color control and constructed with light guards to insure purity of colors. Cyclorama footlights usually recessed in the stage floor but portable arrangements can also be furnished. Borders are sectionalized or continuous as required.

DIRECTIONAL SIGNS

To guide theatre patrons, indicating way to foyer, lounge, rest rooms, etcetera. Box, pedestal and suspension types with concealed illumination. Usually built to meet individual requirement, but standard designs are also available.

Pending completion of a new edition of our General Catalog we have available an interim catalog which will be sent to you upon request.

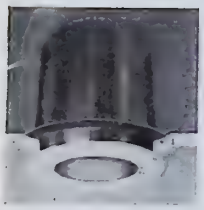
KLIEGL BROS. UNIVERSAL ELECTRIC STAGE LIGHTING CO., Inc.

321 WEST FIFTIETH STREET • NEW YORK 19, N. Y.

CENTURY LIGHTING from Facade

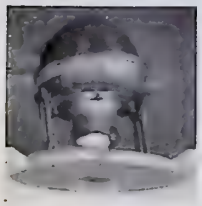
CENTURY EQUIPMENT covers every lighting requirement of the modern motion-picture theatre, presentation house and legitimate theatre from facade to backdrop. Each Century unit is the result of extensive engineering research and wide experience. Century research goes on and its results will be brought to you in the future in better theatre lighting instruments.

Lighting for the Interior and Facade



DOWNLIGHTS

Century has a complete line of recessed downlights for effective use in the theatre lobby and auditorium. Engineered to exacting standards they feature low surface contrast and sharp cut-off at the critical angle of glare. They project their light from a concealed source and create the illusion of a continuous unbroken ceiling area. All instruments take heat resisting color filters in standard and special colors.



PINHOLE SPOTLIGHTS

Century manufactures a line of compact spotlights which may be easily concealed in ceiling or wall. They project a shaped beam through a small aperture to highlight display material and architectural features. Six volt units with a 50-candle power source are manufactured for similar use in dimly lighted interiors.



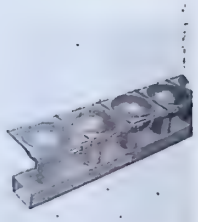
INCANDESCENT FIXTURES

Century manufactures Fresnel lensed flush units and combined fluorescent and incandescent striplights and fixtures to suit every demand of theatre decor.

AISLE and STEPLIGHTS, EXIT SIGNS

Century designed aisle and steplights direct light downward from a concealed source. Century exit signs are manufactured in standard flush and surface types to conform to code laws.

COVELIGHTS



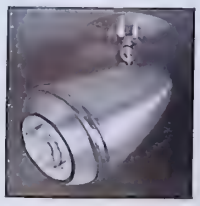
Century fluorescent and incandescent cove lighting provides indirect illumination from an invisible source. It supplies even light distribution over wall and ceiling without a revealing brightness pattern. Available in a variety of designs to meet the rigid interior lighting requirements of the modern theatre.

U-V BLACK LIGHT



Century ultra-violet black light units for use with fluorescent murals and auditorium carpeting add modern glamour to darkened theatre interiors. We manufacture a complete line of fluorescent paint and cloths for use with U-V black light.

DRAMALITES



Century Dramalites are decorative in design and are effective for accent lighting posters and displays from the underside of the theatre marquee or in the lobby interior.

FLOODLIGHTS



Century outdoor floodlights are engineered in standard sizes and designs to beacon light your building face.

CENTURY Lighting Equipment

CENTURY LIGHTING, INC.

FOR THE THEATRE

to backdrop

CENTURY'S ENGINEERING STAFF offers the benefits of long professional experience to designers, architects and owners in the specification, layout and selection of equipment. Consult us early, consult us often for practical solutions to your theatre lighting problems. We will gladly furnish additional information and data sheets covering the use and application of Century equipment.

Lighting for the Stage



LEKOLITES

The Century Lekolite provides a sharply controlled beam of high intensity with the aid of an elliptically shaped reflector and a precision lens system. Through the use of built-in vertical and horizontal shutters, the shape of the beam can be altered to give any simple geometric form. This control permits illumination of a definite area with a greatly increased amount of light. Available in 3", 4½", 6" and 8" lens sizes and wattage ranging from 100 to 2000 watts.



BORDER LIGHTS

Century border lights wired with individual Alzak reflectors are designed to take heat resisting glass roundels in the following colors: Green, blue, amber, straw and clear. Border assemblies include chain hangers and splice boxes.



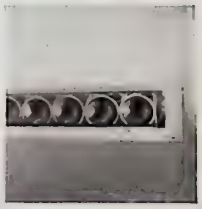
FLOOR POCKETS and PLUG BOXES

Century manufactures a complete line of flush type and portable plug boxes for stage use.



FLUORESCENT FIXTURES

Century fluorescent fixtures provide either direct or indirect illumination. Available in variety designs to meet the rigid interior lighting requirements of the modern theatre. Century manufactures combined fluorescent and incandescent striplights and fixtures.



FOOTLIGHTS

Century disappearing and semi-open trough units are the professional standard for footlight installation. They are wired with individual Alzak reflectors and are designed to take heat resisting glass roundels in the following colors: Red, green, blue, amber, straw and clear.



DIMMERS

Century designs and manufactures portable and stationary dimmers and switch-

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CENTURY LIGHTING, INC.
NEW YORK, N. Y.

Gentlemen: Please send me your Theatre Lighting Catalog.
I am interested in: STAGE LIGHTING EQUIPMENT ☐
INTERIOR LIGHTING EQUIPMENT ☐

Name:_____

Address_____

Telephone No._____

FOR THE THEATRE

to backdrop

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CENTURY LIGHTING, INC.

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NEW YORK 19, N. Y.

FOR THE THEATRE

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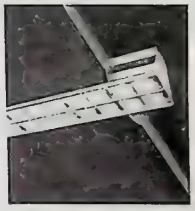


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SEND NOW FOR CATALOG

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DIMMERS



Century designs and manufactures portable and stationary dimmers and switchboards both of the resistance and variable transformer type. Dimmer and switchboards are built to specifications.

is ENGINEERED Lighting Equipment

419 WEST 55th STREET, NEW YORK, 19

626 N. ROBERTSON BLVD., LOS ANGELES, CALIF.

VOIGT *Illuminated Drinking Fountains*



No. 100

Beauty Plus 3 Useful Features

COMBINED IN ONE ATTRACTIVE UNIT

- **SANITARY DRINKING WATER**
- **DECORATIVE MIRROR**
- **MODERN ILLUMINATION**

Do you want to create atmosphere and environment that will attract more business?

Do you want to provide comfort and satisfaction to please customers and make them come again and again?

Then use Voigt Drinking Fountains. Available with or without electric cooling equipment.

Roughing-in diagrams furnished with all details, measurements, etc., for installation, plumbing and electrical connections.

Select the one you like best . . . Include it in your building plans and specifications.



No. 101

EXIT and DIRECTION SIGNS

Wired with light sockets; complete ready to install, less lamp bulb. Illustrations approximately 1/12th actual size.

EDGE-LIGHTED

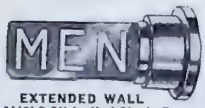


EXTENDED WALL
112-L—1" LADIES
112-M—1" MEN
(Double Face)



FLAT WALL

148-X
6" RED EXIT



EXTENDED WALL
*118LS 2" Ladies' Single Face
118-LD 2" Ladies' Double Face
*118-MS 2" Men Single Face
118-MD 2" Men Double Face
*Specify letters nearest wall—i.e. L or S in Ladies; M or N in Men.



FLAT WALL

148-L—3" LADIES
148-M—3" MEN



CEILING
117-LS 2½" Ladies' Single Face
117-LD 2½" Ladies' Double Face
117-MS 2½" Men Single Face
117-MD 2½" Men Double Face



FLAT WALL
111-L—1" LADIES
111-M—1" MEN



EXTENDED WALL
110 Single Face
110-A Double Face



FLAT WALL
110-B Single Face



CEILING
110-C Single Face
110-D Double Face

ANY LETTERING SANDBLASTED ON PLATE GLASS 4x12", 6x12" OR 8x12" SIZE.
SPECIFY SIZE GLASS OR HEIGHT OF LETTERS

FLUSH TYPE

Metal Box 12"x6½"x3" deep recesses in wall.



128-X
(6" EXIT)



128-LP (LADIES' SILHOUETTE)
128-MP (MEN'S SILHOUETTE)



128-L (4" LADIES)
128-M (4" MEN)

SURFACE TYPE

Size 16½"x7"



108-X
(6" EXIT)



108-MP (MEN'S SILHOUETTE)
108-LP (LADIES' SILHOUETTE)



108-M (4" MEN)
108-L (4" LADIES)

VOIGT COMPANY
ILLUMINATING ENGINEERS
DESIGNERS AND MANUFACTURERS

45th Year

1649 NORTH BROAD STREET
PHILADELPHIA 22, PENNA.

VOIGT *Lighting Equipment*

SEMI-INDIRECT LIGHTING **INDIRECT LIGHTING**



No. 144 — White Alabaster glass. 4 section illustrated. Made in 1, 2, 3, 4 or more sections; 3 lights in each section. Metal parts finished in gold.

No.	Sections	Size	Lights
144	4	40x12"	12
143	3	31x12"	9
142	2	22x12"	6
141	1	12x12"	3

No. 122-A—Half cylinders of White Alabaster glass. Two sections illustrated. Made in 1, 2, 3 or 4 section in 6, 8, 10 and 12" diameter glass. Metal parts finished in gold.

No.	Sections	Size	Lights
121	1	16x6"	3
121-A	1	18x8"	3
121-B	1	20x10"	4
121-C	1	22x12"	5
122	2	36x10"	7
122-A	2	42x12"	9
123	3	54x10"	10
123-A	3	60x12"	12
124	4	74x12"	15

No. 154—All metal for Indirect Lighting. 4 sections illustrated. Made in 1, 2, 3, 4 or more sections, 3 lights in each section. Aluminum finish.

No.	Sections	Size	Lights
154	4	37x12"	12
153	3	29x12"	9
152	2	21x12"	6
151	1	14x12"	3

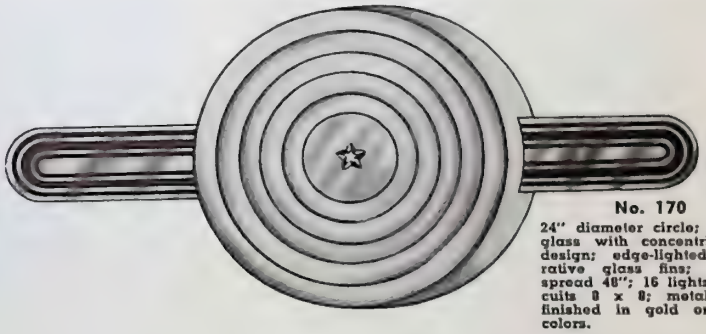
No. 104—Metal louvred vertical fins conceal lamp bulbs yet allow a uniform glow of soft light to filter thru the openings similar to a Venetian blind effect. Top socket arranged for R-40 Reflector Flood lamp.

No.	Size	Lights
104	36x8"	13
104-A	24x8"	9
104-B	48x8"	17



No. 109
Indirect Wall Bracket with luminous glass edges. Light is reflected up and down. Gold finish metal.

Number	Glass size	Lights	Circuits
109	26" long	5	2 (3 x 2)
109-A	22" long	4	2 (2 x 2)
109-B	18½" long	3	2 (2 x 1)
109-C	16½" long	2	1



No. 170
24" diameter circle; frosted glass with concentric ring design; edge-lighted decorative glass fins; overall spread 48"; 16 lights, 2 circuits 8 x 8; metal parts finished in gold or other colors.

No. 171
24" diameter circle only; less glass fins; otherwise same as No. 170.

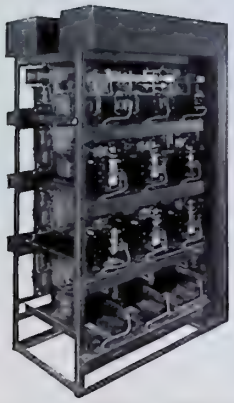
VOIGT COMPANY
THEATRE LIGHTING SPECIALISTS

QUALITY PRODUCTS SINCE 1903 VOIGT COMPANY PHILADELPHIA, PA.

1649 NORTH BROAD STREET
PHILADELPHIA 22, PENNA.



Typical (FA) Electronically controlled Pilot Switchboard. Constructed on the unit basis, this Board is easy to operate, permitting controls to be set for an entire show in advance and operated by a single control lever, instead of the use of many hands. Only a minimum of stage space is required and maintenance costs are exceedingly low through elimination of moving parts and undue friction.



View of Remote Switchboard Assembly showing Reactance Dimmers and Hysterset units with thermeonic vacuum tube control, which provides pre-selective lighting intensity with almost instantaneous reaction to the operation of the control element and a dimming control system capable of controlling a wide range of connected loads on each circuit.



Typical Board for controlling lighting from sub-stations located at various points in the theatre or auditorium — another (FA) Stage Lighting control feature.

The Light Touch

STAGE LIGHTING CONTROLS

For the right *light* touch for theatres and auditoriums, insist on Frank Adam Stage Switchboards and light control equipment.

More than 50 years of specialized experience in theatre lighting and control has enabled Frank Adam to produce quality equipment ideally suited to the needs and demands of the smallest to the largest theatre or auditorium.

Frank Adam Stage Switchboards and lighting control are available either for manual operation or with electronic controls. Consult a (FA) representative, conveniently located in most of the large cities of the country, for complete details.

PILOT CONTROL SWITCHBOARDS

Manual Control
Modified Pre-Set Remote Control
Multiple Pre-Set Remote Control
Electronic Tube Control
Mobile Color Lighting Control

DIMMING CONTROL EQUIPMENT

Resistor Dimmers
Auto-Transformer Type
Reactor Type

FA TRADE MARK

Frank Adam Electric Co.

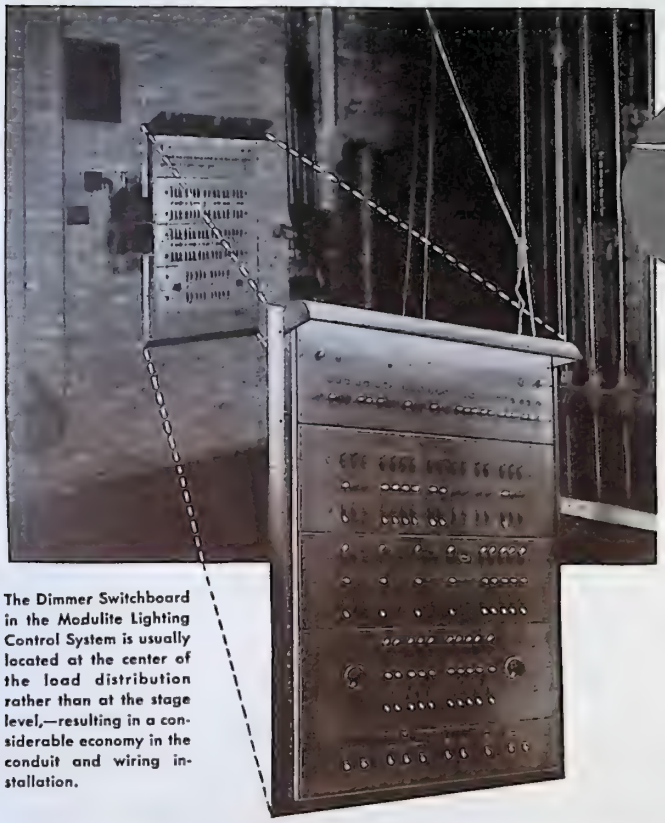
ST. LOUIS 13, MO.

Wm. Wurdack Electric Division
of

FEDERAL ELECTRIC PRODUCTS COMPANY

4444 CLAYTON AVE.
ST. LOUIS 10, MO.

Representatives in Principal Cities



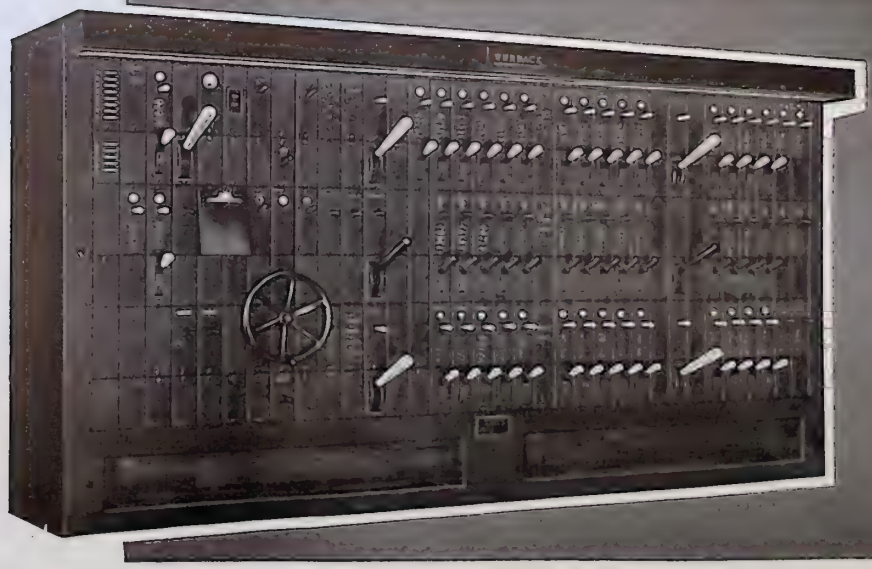
The Dimmer Switchboard in the Modulite Lighting Control System is usually located at the center of the load distribution rather than at the stage level,—resulting in a considerable economy in the conduit and wiring installation.

WURDACK MAJOR MODULITE LIGHTING CONTROL SYSTEM

for THEATRES
AUDITORIUMS
RADIO PRODUCTION CENTERS
SCHOOLS—COLLEGES
THEATRE—RESTAURANTS
LODGE BUILDINGS

The Modulite Lighting Control Pilot Switchboard appearing in the illustration has 43 4000-watt Dimmer Controls in 2 presets and 24 Individual Contactor Controls with Master Blackout coupled with a number of unique features including Dual Fader control, two simultaneous Dimming speeds and Remote Fader Mastering. Due to the compactness of the design of the Pilot Switchboard a minimum of wall space is required.

WURDACK MULTI-PRESET STAGE SWITCHBOARD

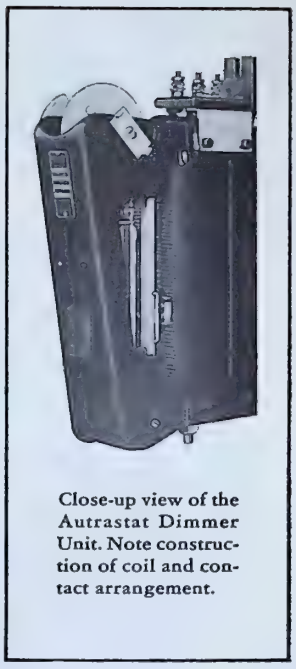


A typical Wurdack Multi-Master Pre-Set Pilot and Dimmer Switchboard which is usually located at the stage level with the Remote Control Switchboard located elsewhere in a fire-proof and sound-proof room.

This switchboard has provision for 48 individual sections each with Theatre Switch, Indicating Bull's Eye, Five preset switches and dimmers ranging in capacity from 2000 watts to 24,000 watts. Also Color Master sections, Stage Master, Pocket Master, House Master and All Master Preset switch control sections with Slow Motion Grand Master for the Dimmers.







Close-up view of the Autrastat Dimmer Unit. Note construction of coil and contact arrangement.

Front and side view of Trumbull Autrastat Controlite showing compact arrangement of all dimming and switching controls. All necessary main and branch circuit protections are incorporated into one composite stage switchboard.

TRUMBULL "Controlite"

with AUTRASTAT Improved Dimming Control

Combining switching and dimming units in one compact switchboard, the Trumbull "Controlite" is complete with all internal wiring and branch circuit protections. Only connections to main lugs and branch circuit terminals are necessary.

The Autrastat, an auto-transformer dimming unit, varies the load voltage . . . provides 115 steps of flickerless dimming with minimum amount of electrical losses.

Controlite thus provides flexibility of control for both switching and dimming. As many controls as may be required can be incorporated to produce a switchboard that's "made to order" as well as economical and long-lasting.

The Trumbull Controlite Switchboard with Autrastat dimming control is ideal for all types of theatres, stages, schools, lodges, night clubs—in fact, wherever lighting is to be controlled. No job is too large or too small for Controlite, the equipment that makes *lighting* a part of the show. *Send for bulletin.* The Trumbull Electric Manufacturing Company, Plainville, Connecticut.

Be Right with Controlite

TRUMBULL (T) ELECTRIC

theatre dimmers

A NEW AUTRASTAT DIMMER

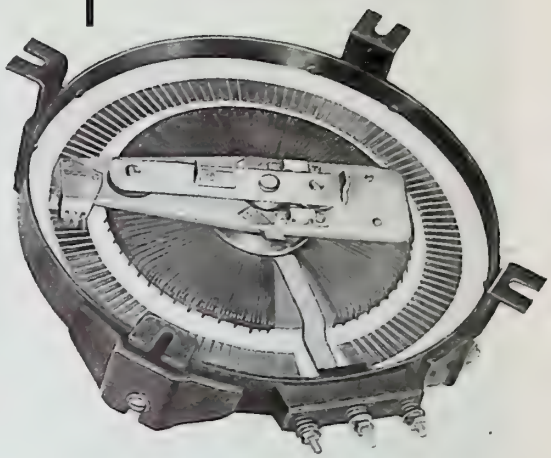
New Radial Type Autrastat Dimmer for Theatre Lighting Control has all the characteristics of the rectangular type Autrastat, such as continuous duty at any setting, lamp voltage independent of load, uniform dimming curve, low core loss, and low operating temperatures (eliminating any necessity for special ventilation or cooling apparatus).

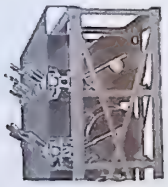
A number of *new* features have been added, however, which make the Radial Type Autrastat the most flexible, efficient and reliable dimmer for manual or remote motor operated applications. New metal base plate provides a rigid, substantial means of mounting. Toroidal core and coil further reduces core losses and provides higher efficiency. Large solid brass contacts give greater capacity (better commutation without oxidation). Multiple shoe construction of silver graphite — self-lubricating and self-cleaning — assures good arcless contact. Oil-less center bearing reduces operating torque to a minimum and lowers maintenance.

Available in capacities up to 8000 watts in a single unit.

radial type

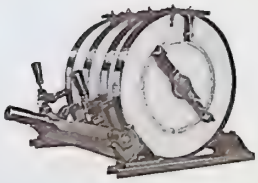
- HIGHER CAPACITY
- HIGHER EFFICIENCY
- EASIER OPERATION
- LESS SPACE
- LOWER MAINTENANCE





AUTRASTAT DIMMER BANKS

Auto-transformer type dimmers operating on 110-120 volt 50-60 cycles A.C. Voltage applied to lamp circuit can be adjusted for any intensity. May be interlocked and arranged in banks for manual or motor drive. Ideal for Controlite (composite stage switchboard) construction. Write for Bulletin 76.



TYPE RD INTERLOCKING DIMMER BANKS

Resistance type dimmers assembled in frames for floor, wall or other types of mounting. Each dimmer plate equipped with interlocking lever for master control or grand master control of several tiers of dimmers. Double interlocking masters and worm wheel, slow motion cross control may be had. Write for Bulletin 72.



TYPE SRD NON-INTERLOCKING DIMMERS

Resistance type for small theatres, churches, etc. — for front or rear of wall mounting. When ordering, specify type of mounting, total wattage of connected load, voltage, whether two or three wire. Write for Bulletin 71.



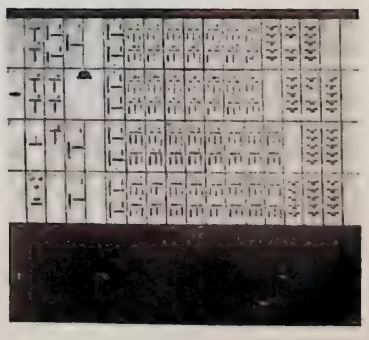
TYPE BD DIMMERS

Resistance type, suitable for portable switchboards or motion picture studios. May be arranged for wall or floor mounting. Write for Bulletin 71.



REACTANCE DIMMER BANKS

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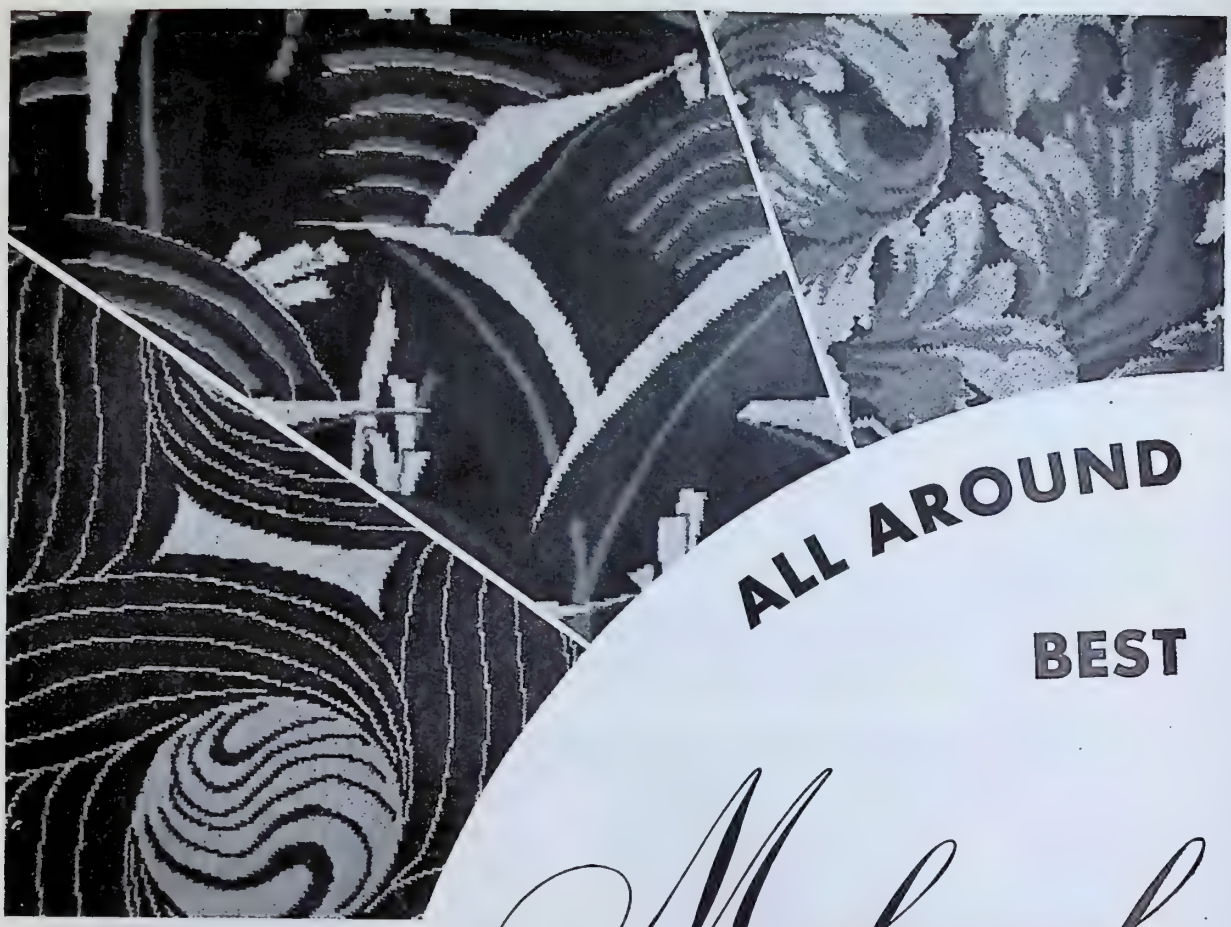
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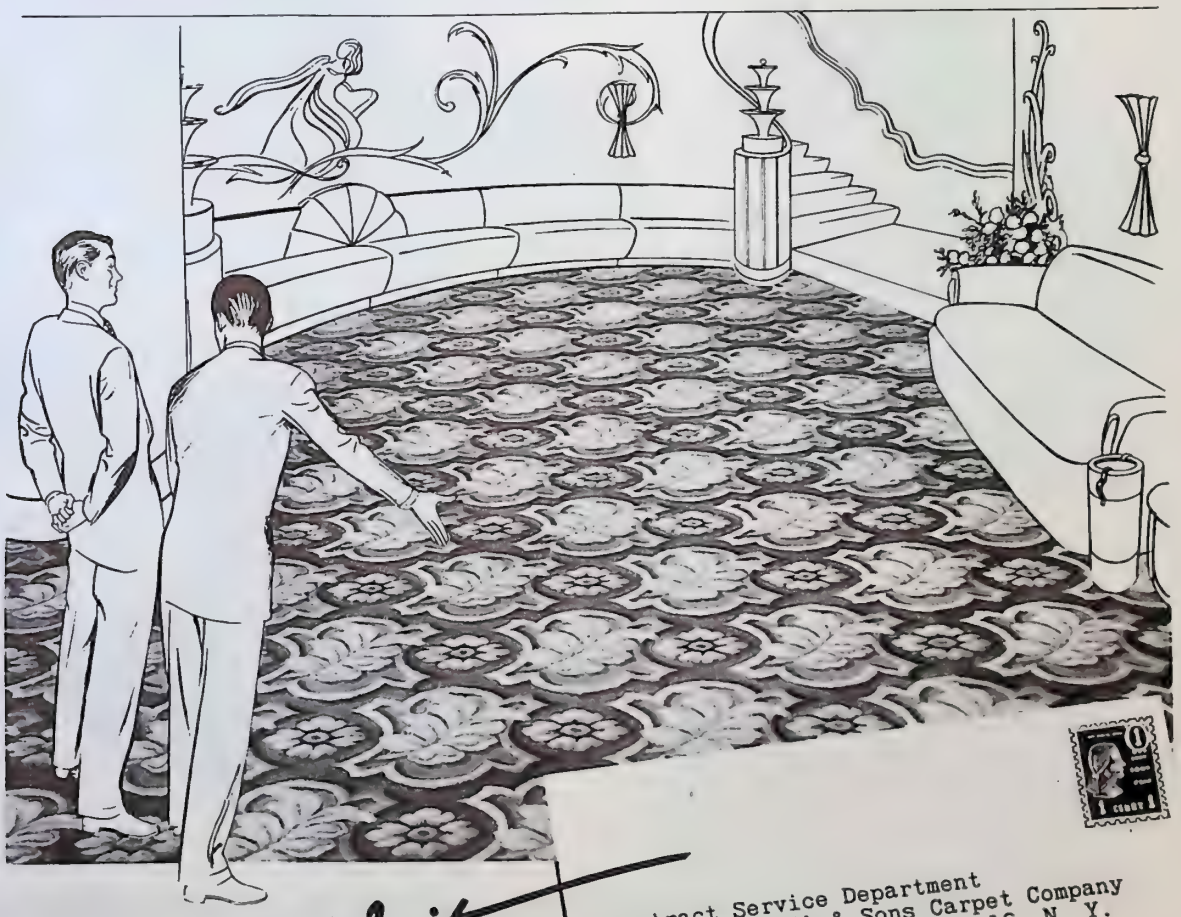
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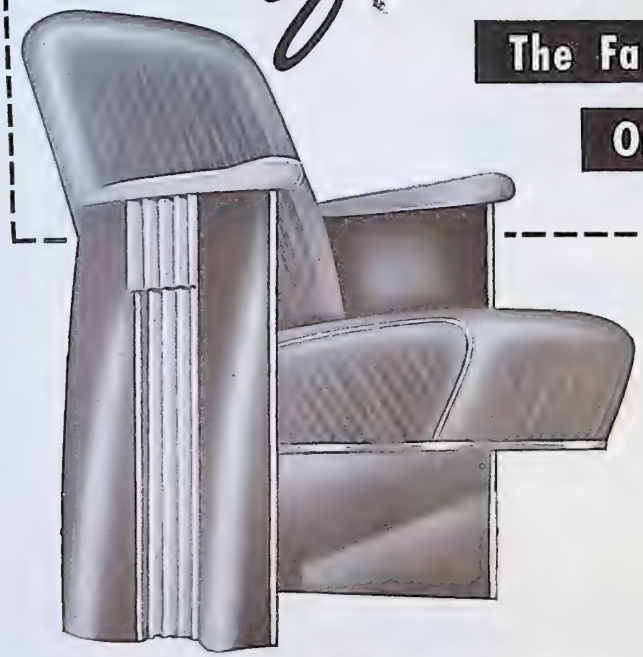
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LOUNGES and PUBLIC ROOMS

1947-48

The New Circlarc Lamp for Lounge Lighting

Decorative Illumination for Public Areas Made Possible by the Half-Circle Design

EUGENE W. BEGGS
Westinghouse Electric Corporation

With the advent of the newly standardized half-circle fluorescent lamp, known as the Circlarc, manufacturers have broken with the traditions of the past and now provide a production lamp that can be incorporated in bare lamp installations to provide a flowing pattern of light on walls or ceilings. The half-circle design also releases the architect or lighting designer from many of the restrictions imposed by straight tubes or the full-circle lamp known as the Circline. It is too early now to predict the extent to which this new half-circle lamp will be used in theatre lighting but there is little doubt that this field of application will be one of the more important ones in which it is applied.

The 18-watt, 12-inch T-8 Circlarc fluorescent lamp is a curved fluorescent lamp made in the form of a half circle 12 inches in diameter. Used singly or in multiple arrangements, it provides a flexibility of application not obtainable with the full-circle lamp. The arc stream of each lamp is short so it may be operated directly from the 110-125-volt a.c. lighting circuit with a small low cost choke as a ballast. Also, the semi-circular shape makes it possible to obtain, with a curved fluorescent lamp, the advantages of mass production machinery previously available only with straight tube lamps.

The 18-watt Circlarc lamp operates on a simple reactor type ballast with the regular manual or the FS-2 glow switch starter used for 15- and 20-watt standard fluorescent lamps. Ballast used with the 18-watt Circlarc lamp should be suitable to carry the 0.380 operating amperes without overheating.

The Circlarc base pins are located at 45 degrees to the plane of the lamp which allows the pins of the two opposing lamp bases to overlap and reduce the thickness of a two-lamp holder to a minimum. Holders should provide good electrical contact with the pin receptacles arranged to float laterally about ⅛ inch so as to allow for the lamp manufacturing tolerances in diameter required.

Pattern and Built-in Lighting

The Circlarc lamp provides a fluorescent shape that is badly needed for new type lighting throughout the theatre. For example, this semi-curcular lamp can be used to form a pattern of light on the ceiling and walls and, in warm climates, on the marquee and the theatre sign. Built-in lights for the niche over the water fountain, and arch of light over the ticket window, pedestal lighting beneath or above flowers or statuettes and a diadem of light over small exhibits such as costume jewelry and the like, all represent new and interesting uses of fluorescent lamps which require a semi-circular shape of lamp.

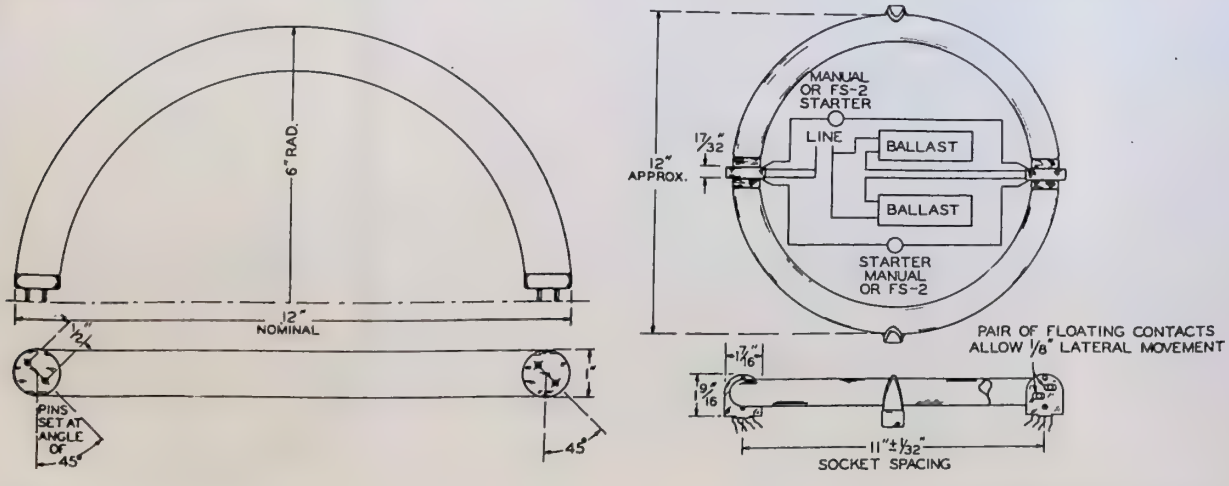
Pinup type wall fixtures with the half circle lamp in the horizontal position extending out from the wall provide downward or upward light where needed on or near the wall. For example, beneath a small picture the Circlarc is better than a straight tube against the wall because the center of the luminous tube is automatically extended from the wall by the graceful curve of the fixture and this makes it possible to throw a greater intensity of light to the top of the picture. Similarly, where a wall fixture is inverted to throw light downward this provides and excellent illuminant for growing plants or vases of flowers mounted on tables or against the wall in the lobby or elsewhere in the theatre building.

Naturally, appearance of lighting equipment is of great importance in the theatre. Aside from the technical advantages of the Circlarc lamp, there is also the basic fact that the curved form is interesting and attractive in contrast to the straight rod-like shapes of most standard fluorescent lamps in general use today. Where single lamps are used in desk, wall and other types of fixtures, this curved shape is perhaps the most important contribution offered by the new Circlarc lamp.

Simplified Maintenance

The half-circle lamp makes replacement of burnouts a simple and practical operation even in fixtures using more than one complete circle of fluorescent tubing. Such relatively elaborate units are commonly required in large areas as theatre buildings where a single Circline lamp would be inadequate. Two of these tubes form a complete circle and produce comparable lighting results to the Circline lamp. A circle of light built up with two Circlarcs can be taken apart and a burned out lamp readily replaced whereas it is difficult to relamp a Circline fixture using more than one lamp since these ring shaped lamps cannot be threaded through one another. It is this flexibility in the use of the

DETAIL DRAWING of the Westinghouse 18-watt Circlarc fluorescent lamp is given at the left, with the right-hand drawing showing how two of the lamps can be joined to form a circle of light. The lamp is in the form of a half circle 12 inches in diameter. The arc stream is so short that it may be operated directly from the 110-125-volt a.c. lighting circuit with a small, low-cost choke as a ballast. The base pins are located at 45 degrees to the plane of the lamp, allowing two opposing lamps to overlap. The right drawing also shows the required ballast connections.



Circlarc lamp that will recommend it for larger multiple lamp fixtures in the theatre.

In the design of ceiling fixtures of the conventional type, we have become accustomed to square ends or continuous runs in our design. Architects and designers, however, have not been pleased with this condition but have always wanted a rounded end of the fixture. The Circlarc lamp can now be used to provide this improvement particularly desirable where the appearance of the room is important as is the case in the lighting of theatres or their associated buildings and areas. The Circlarc lamp not only rounds off the fixture making it more attractive but introduces luminosity at the end which is desirable to avoid shadows. This rounded end also makes it possible to nest down-lights using the reflector bulb lamp mounted inside the curve without loss of beauty in the fixture.

Application in Portable Lamps

Of course, the application of the Circlarc to portable lamps is practically unlimited. Designers are now developing this field which will probably be one of the first in which the new products is used in volume. The obvious applications are desk lamps, floor lamps, table lamps, and wall brackets using one or a multiplicity of Circlarc tubes.

In the desk lamp designs the curved tube provides a relief from the rectangular fixtures using straight tubes and in this way will be welcomed by designers of this type of equipment. These, and of course all other Circlarc fixtures, can be readily designed to be operated on 120 volt d.c. circuits which is quite common in downtown areas of large cities. The technical data on the d.c. use is given later.

Floor and table lamps will generally use Circlarc lamps in pairs to provide a full circle of luminous tubing mounted under the traditional circular lamp shade. Large rooms, however, such as theatre lobbies, will often find need for fixtures using more than one circle and here two or more pairs of Circlarc lamps will be supplied. Where desirable, this will also make it possible to obtain many levels of lighting. In the case of a fixture using two pairs of Circlarc lamps, for example, four levels of light intensity can be obtained by progressively switching the lamps on or off. Such application will generally require that the shade be made of opaque material.

D.C. Operation

The 18-watt Circlarc lamp is designed basically for operation on alternating current but it may be operated on direct current with quite satisfactory results if the proper auxiliaries are used and the line voltage is between 110-125 volts. Under these conditions, the lamps can be expected to give about 80 percent of the normal a.c. life performance. The end blackening of the tube will be a little more severe than on alternating current resulting in a somewhat lower lumen maintenance throughout life.

To assure dependable lamp starting, an inductive ballast as well as the regular d.c. resistance ballast must be used. This provides the necessary voltage surge that establishes the arc between the electrodes at each end of the tube. The inductive ballast used may be the standard ballast used for the a.c. operation and it may be installed as for normal a.c. service. A suggested arrangement of the resistance ballast is at the baseboard outlet with a provision for plugging in a complete standard a.c. fixture with its complete a.c. circuit and auxiliaries.

It may be necessary to reverse the flow of current periodically through the lamp to prevent dimming at one end due to migration of the mercury vapor. This is a characteristic of d.c. operation of fluorescent lamps. If the lamps operate continuously or for several hours at a time, some of the mercury will become concentrated at one end of the lamp and cause the other end to become dim. The use of a polarity reversing switch or simply reversing the base plug terminals in the baseboard outlet twice a day will serve to eliminate this condition.

The recommended values of series resistance and other technical data of interest in connection with d.c. operation of these lamps is given in the following summation:

D.c. lamp current ..... 0.32 ampere

External resistance required:

110 volts ..... 148 ohms

120 volts ..... 180 ohms

(These values of resistance must be used in series with the regular a.c. inductive ballast used with this lamp. This resistance is in addition to the 24 ohms internal resistance of the inductance. Resistors must be capable of carrying the lamp current without overheating and should be within about 10 percent of the values shown.)

Resistance per volt ..... 3.2 ohms

(For other line voltages, the resistance required may be corrected by adding or subtracting the number of ohms indicated for each volt difference.)

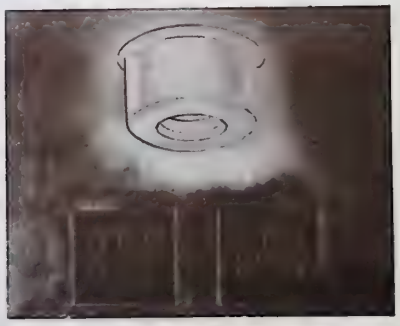
Approximate auxiliary loss per lamp (resistance plus inductance) 21 watts

The Circlarc lamp is now available in one size—an 18-watt, T-8 curved fluorescent lamp in the form of a half circle 12 inches in outside diameter. It is provided with the standard bipin base at each end but the base pins are located at an angle of 45 degrees to the plane of the lamp so that two lamps can be mounted to form a 360 degree circle with a minimum of dark space. The use of the preheat hot cathode design permits operation of the lamp on a very small simple choke type ballast directly from 120 volt a.c. lighting circuit. This reduces the space occupied by the auxiliaries required for the lamp's operation and also, of course, minimizes the initial investment in this type of lighting.

Ultimately it is quite possible that the Circlarc lamp will be made available in other sizes and in other colors besides the present standard white (3,500 degrees Kelvin color temperature). At present, however, the lamp will be available in only one size and one color. Since the new lamp was introduced largely because it can be adapted to manufacture on automatic machinery, this one size and the machines to make it in volume will be perfected before other sizes are introduced.

It is hoped that the 18-watt, 12-inch Circlarc lamp will be found in practice to be as important as it would appear to be. Its designers and makers will feel that their efforts are well repaid if it does help extend the use of fluorescent lighting in the American theatre.

USES OF THE CIRCLARC LAMPS are shown here. At the left are two ideas for utilizing the Circlarcs in ceiling lighting, in conjunction with both incandescent as well as the regular tube-type fluorescents. At the right is shown a desk lamp using a pair of Circlarcs. The half-circle lamps can also be used in table and floor lamps, as well as for effective illumination of standee and other types of displays.







Public Telephone Facilities for Theatres

The Factors of Site, Design, and Equipment For Pay Stations and Directory Facilities

H. W. Meehan
American Telephone and Telegraph Company

Many advantages are to be gained by making adequate provision for public telephones in theatres. The appearance and usefulness of these facilities are enhanced when they are included in the original design of the theatre and are located in convenient places. It is recommended, therefore, that the builders of theatres provide telephone booths and directory spaces that harmonize with their surroundings by making them permanent parts of the buildings. Figures 1 to 4 are typical of the results obtainable by designing for the inclusion of public telephone and directory facilities in theatres, rather than adding them in left-over space as an afterthought.

Reception rooms and lounges are frequently the most logical places for the public telephones. Depending on the lay-

FIGURE 1—This picture, together with those of Figures 2, 3, and 4, shows a typical result obtainable by designing for the inclusion of public telephone and directory facilities in theatres, rather than adding them in left-over space as an after thought. From the standpoint of appearance of the directory facilities, built-in shelves of niches, such as is seen here and in Figures 2 and 3, are desirable. The appearance and usefulness of these facilities are enhanced when they are designed in. While telephone booths can be obtained as a unit, the component parts are also available.





FIGURE 2—A built-in public telephone and its associated directory facility is shown here. Note that in all cases (compare with Figures 1 and 3) special lighting is provided above the directories which are themselves hung on special holders to facilitate use and to minimize destruction.

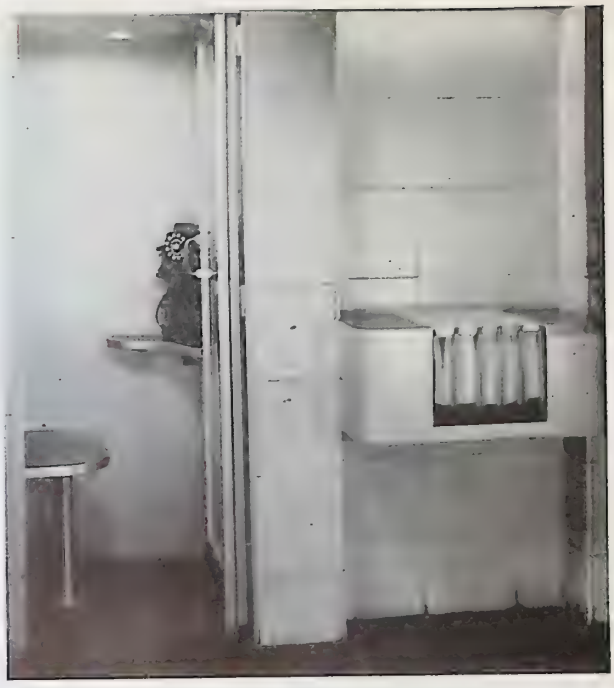


FIGURE 3—Treatment for a telephone booth sometimes varies according to the place it will eventually occupy. Here, for example, is a design similar to that shown in Figure 1, but very obviously is adapted to the tiled surroundings of a smoking room rather than the marbled elegance of a foyer.

FIGURE 4—In larger theatres where a great volume of telephone call can be expected, space should be provided for an expansive set-up, such as this corner of the facilities provided in the Radio City Music Hall, New York. Just visible at the right of the picture is one of the sets of directories available. For maximum comfort, booths should be provided with seats and should be well lighted and ventilated. A small fan may also be desirable to add to the comfort of the user. Lights and fans can be wired so that they are turned on when the door is closed.



MULTIPLE INSTALLATIONS

NO. OF UNITS	OVERALL WIDTH
2	5′ - 0¼″
3	7′ - 5⅞″
4	9′ -11½″
5	12′ - 5⅛″

INSIDE DIMENSIONS

WIDTH	2′ - 3¼″
DEPTH	2′ - 3⅞″
HEIGHT	6′ - 6″

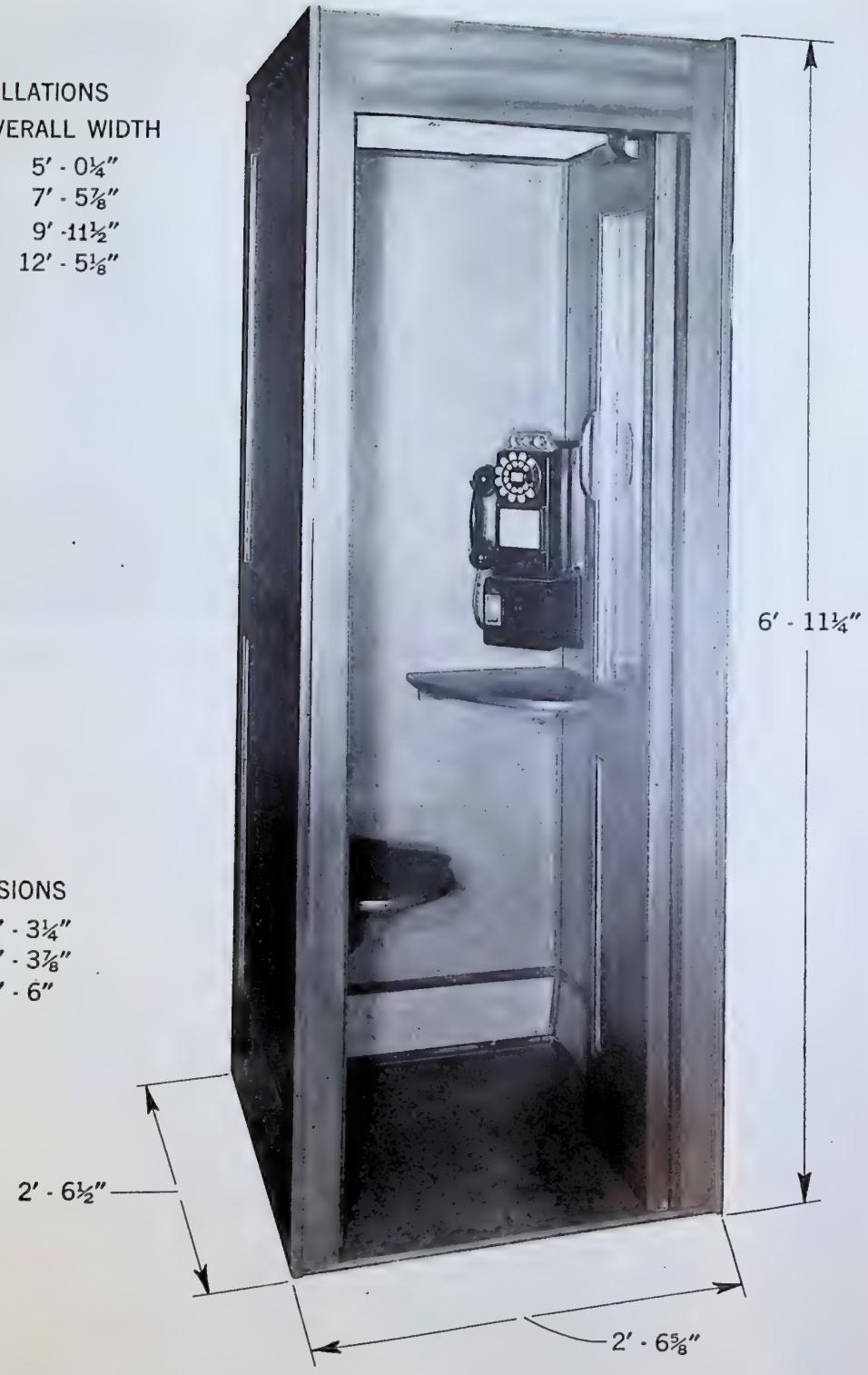


FIGURE 5—While some architects may, under the proper circumstances, prefer to design the booths themselves, many more, however, take advantage of the complete booths which are available from distributors of telephone supplies, such as the Graybar Electric Company. One such more or less standard booth is shown here, with the outside and inside dimensions of a single unit, and the overall widths of multiple installations of two to five units. Such booths can be recessed in walls or partitions and, by applying conforming trim, made to appear as a part of the building. As an alternative procedure, essential parts such as the booth front with folding door, door guide, ceiling light, and linkage for placing the light switch under control of the door may be procured and used in fabricating the booths locally. The booths can be lined with any suitable material which fits in with the plans for decoration. It may be mentioned, however, that general experience has indicated the superiority of lining materials which resist scratching and which do not conspicuously show pencil marks. Folding doors with full-length glass panels are generally preferable. Since they fold within the booth, such doors present none of the hazards of outward swinging doors. The design should be such as to avoid the possibility of finger pinching. There should be adequate clearance between the open door and the coin collector to prevent any accidents.

out and on the size and type of theatre, other desirable locations may be in lobbies, foyers, mezzanine landings, and powder rooms. To prevent the possibility of injury to persons using the booths, locations adjacent to swinging doors, descending stirways or other possible hazards should be avoided. Wherever the locations, to be of greatest value to patrons they must be readily accessible and so clearly designated that patrons will not be required to inquire as to the location. Illuminated directional signs will frequently help in this connection. In order to assure privacy, it is desirable to place booths in a quiet location and to equip them with doors for excluding room noise.

Approximate space requirements for telephone booths of the usual size are shown in Figure 5. Figure 6 illustrates a larger booth which accommodates a swivel arm chair. Another size sometimes used for locally constructed built-in booths equipped with seats has inside dimensions approximately 30x30 inches.

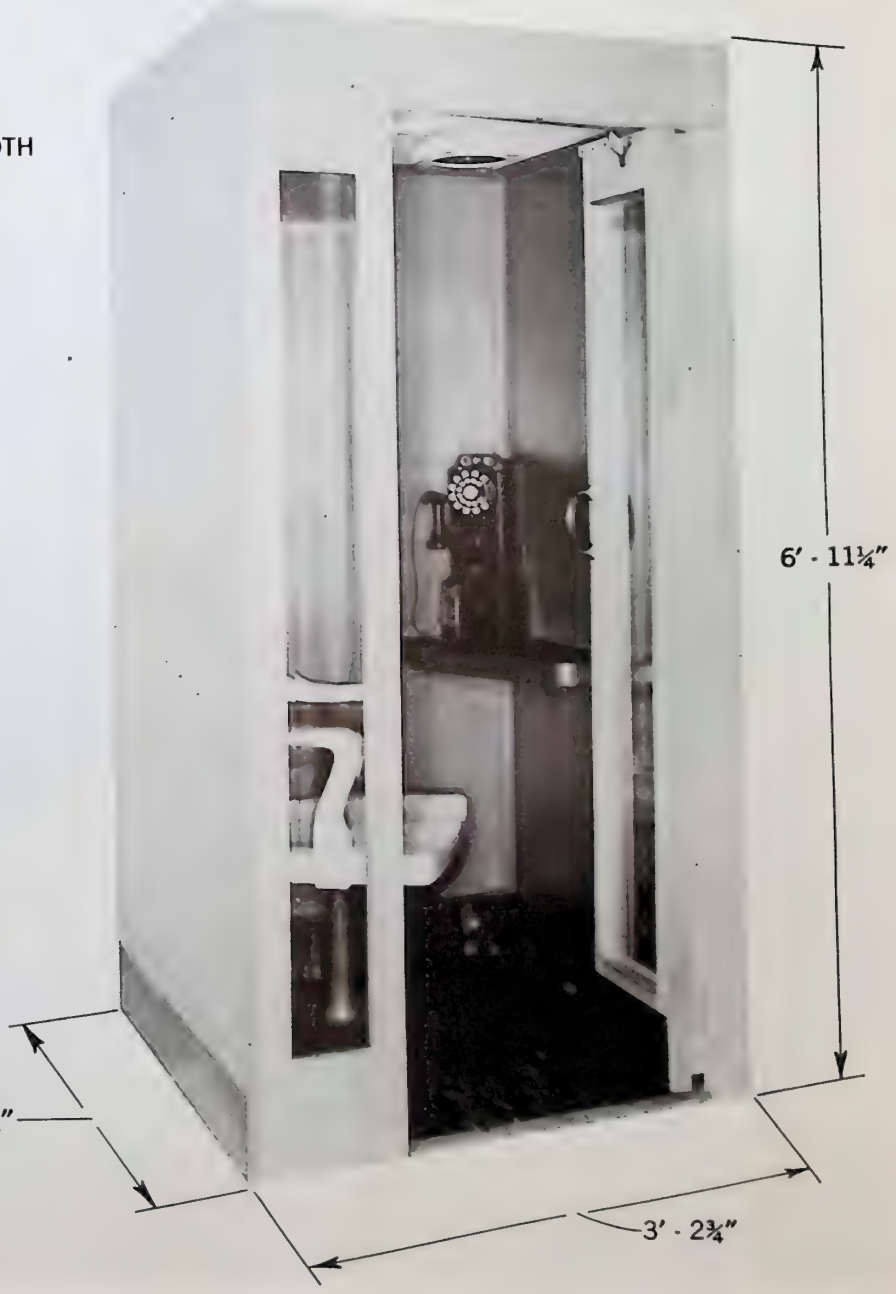
Complete booths in sizes approximating those shown in Figures 5 and 6 are obtainable from distributors of telephone supplies such as the Graybar Electric Company. These can be recessed in walls or partitions and by applying conforming trim made to appear as part of the building. As an alternative procedure, essential parts such as the booth front with folding door, door guide, ceiling light, and linkage for placing the light switch under control of the door may be procured and used in fabricating the booths locally. With either method, the booths can be lined with any suitable material which fits in with the plans for decoration. It may be mentioned, however, that general experience with telephone booths has indicated the superiority of lining materials which resist scratching and which do not show up pencil marks conspicuously.

Folding doors equipped with full

FIGURE 6 — A more sumptuous — and larger — booth than that of Figure 5 is shown here, but the same comments apply. The ceiling may be treated to reduce acoustic reverberation, but more extensive treatment of door-type booths is usually unecessary. In the case of doorless booths, the inside depth must be considerably greater than the inside width. In addition, the ceiling and upper portion of the walls must be lined with an efficient sound-absorbing material.

MULTIPLE INSTALLATIONS

NO. OF UNITS	OVERALL WIDTH
2	6′ - 4½″
3	9′ - 6¼″
4	12′ - 8″
5	15′ - 9¾″



INSIDE DIMENSIONS

WIDTH	2′ - 11¼″
DEPTH	2′ - 9⅞″
HEIGHT	6′ - 6″

length glass panels are generally preferable. Since they fold within the booth, such doors present none of the hazards of outward swinging doors. The design should be such as to avoid the possibility of finger pinching. For the same reason there should be adequate clearance between the open door and the shelf under the coin collector.

For maximum comfort the booths should be provided with seats and should be well lighted and ventilated. A small fan may also be desirable to add to the comfort of the user. As an added refinement, the ceiling may be treated to reduce acoustic reverberation within the booth. More extensive acoustic treatment of door type booths is usually unnecessary.

Doorless booths are usually provided at public telephone stations only where some special condition must be met. To exclude outside noise effectively and prevent overhearing of telephone conversation, the inside depth of such booths must be considerably greater than the inside width and the entrance must be restricted in width. In addition, the ceiling and the upper portion of the walls must be lined with a highly efficient sound absorbing material. Doorless booths, of course, do not readily lend themselves to automatic control of the booth light.

No public telephone installation is complete unless it is accompanied by adequate and well lighted directory facilities. If the theatre is one which is patronized by residents from surrounding suburban communities, it may be desirable to arrange for the display of appropriate suburban directories in addition to the local books. From the appearance standpoint, built-in shelves or niches similar to those in Figures 1, 2 and 3 are desirable. Similar directory holders are procurable in table form. Another type of directory rack is shown in Figure 7. Figure 8 covers another model of the same holder designed for mounting on a wall or the side of a booth.

Consultation with the telephone company in the early stages of planning a new theatre will help to insure that the facilities for public telephone service mentioned above are provided in the amount and type which best meet the requirements of the situation. The telephone company is glad to render this service. This will also insure that advantage can be taken of the latest developments and ideas in providing a convenient public telephone service.

The telephone company also will be glad to furnish information as to the conduit requirements for telephone wiring to the proposed public telephone stations and as to the number and locations for electric outlets for the booths and directory lights. The telephone company representatives likewise have information covering the mounting of coin collectors and the provisions for wiring to them in the case of locally constructed booths. For this reason, early consideration of these points with the telephone company representatives is desirable.

FIGURE 7—For telephone directories, built-in shelves or niches (see Figures 1, 2, and 3) are frequently used, but the directory rack shown here is another method of handling this facility. In the larger communities, the collection of directories should also include those for the suburban regions.

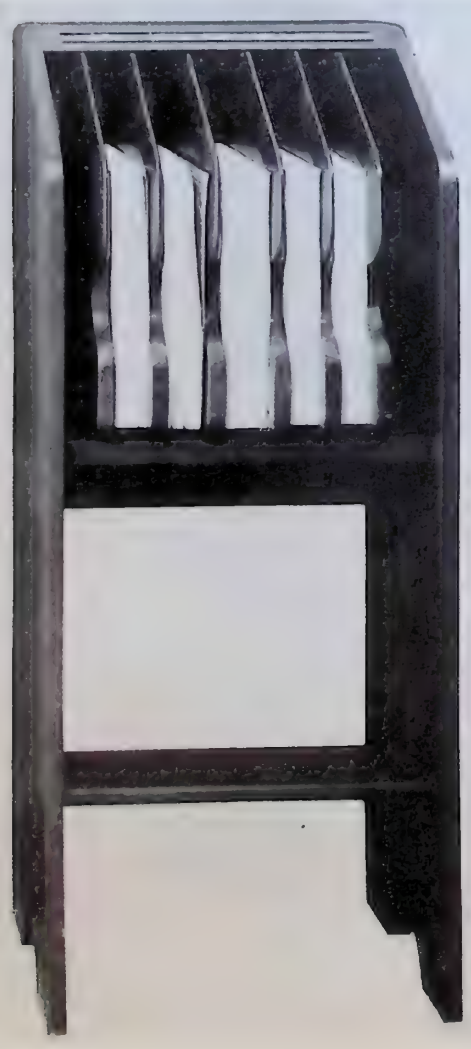


FIGURE 8—A development of the rack shown in Figure 7 is this one, designed for mounting on the wall or the side of a telephone booth. On all matters of telephone facilities, architects and builders, as well as the owner, should work in close cooperation with the local telephone company.



Plumbing Fixtures for the Modern Theatre

Rely on a Master Plumber for Installation Of Fine Fixtures for Long-Lasting Service

W. Richard Barnhart
American Radiator and Standard Sanitary Corporation

Modern theatre washrooms are a far cry from those of yesterday. Spacious, well-lighted rooms gleam with mirrors, structural glass, chromium, and tile. Up-to-the-minute washrooms boast shining plumbing fixtures, wall-hung for quick and easy cleaning of floors and operated by foot pedals so that users need never touch them with their hands. And these fixtures, available in a wide variety of glowing colors, contribute greatly to the striking decorative effects achieved.

Yet even more important than their appearance is the contribution of fine plumbing fixtures to the well-being of the theatre patron. These fixtures furnish the fresh, pure water so essential to comfort and carry away the wastes so dangerous to health. To serve health and comfort is the prime purpose of quality plumbing fixtures.

CONSTANT ADVANCEMENTS

Largely responsible for the countless improvements made for better sanitation, increased utility, and greater beauty in plumbing fixtures are the research departments and design and development departments of the established plumbing fixture manufacturers. Here, scientists and engineers are constantly at work, seeking ways of creating better and better products.

Their achievements are reflected in the design and construction of the plumbing fixtures so often taken for granted by the public. For instance, low and compact water closets and scientifically proportioned urinals are the products of applied hydraulic engineering and pottery techniques. These fixtures embody a quieter and more thorough flushing efficiency. They are strong and sturdy. And they retain their good looks through the years.

FUNDAMENTAL PRINCIPLES

Although it is necessary for the water closet to harmonize with other fixtures and present a pleasing appearance, it is even more important that it function in the most efficient and satisfactory manner. The first and foremost function of a water closet is the disposal of faecal matter, and any factor introduced into a water closet structure which reduces or limits this function is at the expense of the more important sanitary considerations.

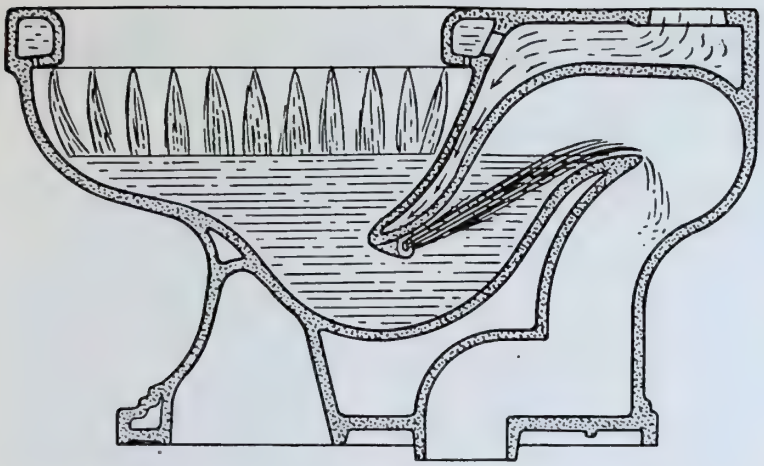
The essentials of the "perfect" water closet, from a sanitary viewpoint, are: (1) an effective water seal (water remaining in bowl after flushing), (2) prompt discharge of bowl contents, (3) a trapway of suitable size to assure complete flushing, (4) large water area, (5) thorough scouring of the bowl cavity at each flush, (6) quiet operation and (7) economy in the use of water. Among the types of water closet meeting these requirements is the syphon jet type, which is ideal for use in theatre toilet rooms.

The sequence of action, when such a water closet is flushed, is as follows:

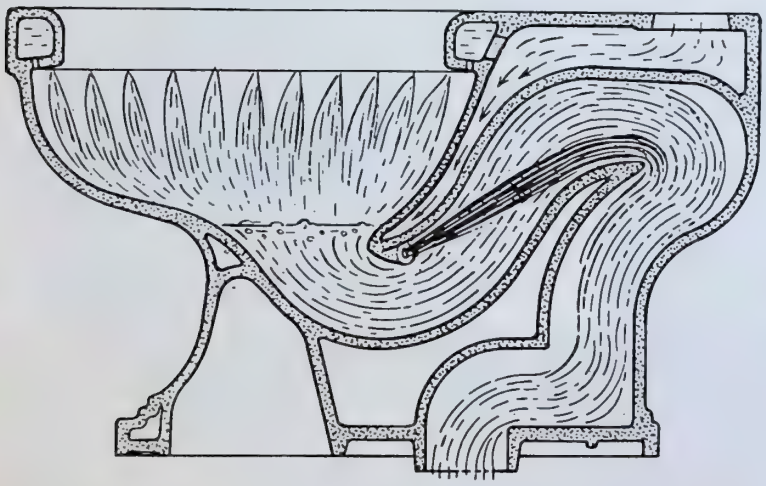
The water normally present in the bowl as a refill or water seal is thrown over the dam into the down-leg by the action of the flushing supply from the flush valve, and the water piles up in

MODERN THEATRE WASHROOMS are a far cry from those of yesterday. Spacious, well-lighted rooms gleam with mirrors, structural glass, chromium and tile. Up-to-the-minute washrooms boast such shining plumbing fixtures as these Buena lavatories, hung from the wall so that the floors may be quickly and easily cleaned. Fixtures, available in a wide variety of glowing colors, contribute greatly to the striking decorative effects that can be achieved. More important than looks is the contribution of fine fixtures to the health and comfort of all theatre patrons at all times.

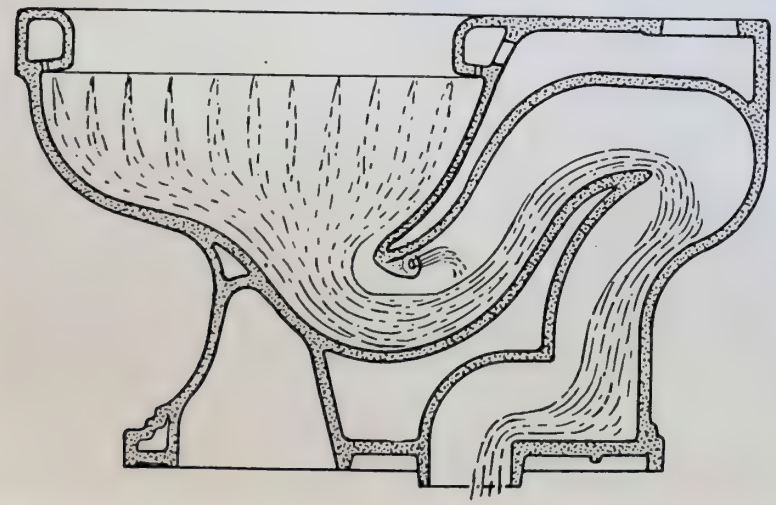




THE SEQUENCE OF FLUSHING ACTION is as follows: The water normally present in the bowl as a refill or water seal (top) is thrown over the dam into the down-leg by the action of the flushing supply from the flush valve, and the water piles up in the down leg. The operation is hastened considerably by the action of a jet (top and center) which stimulates the movement of water over the dam.



AS WATER CONTINUES to pile up (top and center), the added weight of water in the down-leg and the lesser weight in the up-leg cause a faster flow through the down-leg and create a syphonic action which empties the bowl and expells the contents. When the water in the down-leg lowers to a certain point (bottom), the syphon action is broken and flushing action ceases. Modern urinals are similar.



the down-leg. This operation is hastened considerably by the action of a jet which stimulates the movement of water over the dam.

As water continues to pile up, the added weight of water in the down-leg and the lesser weight in the up-leg cause a faster flow through the down-leg and create syphonic action which empties the bowl and expells the contents. When the water in the down-leg lowers to a certain point, the syphon is broken and the flushing action ceases.

Modern urinals, correctly proportioned to assure proper use and higest standards of sanitation, function in much the same way as a water closet. When they are flushed, contents are quickly expelled and the bowl is thoroughly cleansed.

FIXTURES OF VITREOUS CHINA

The finest water closets and urinals are made of genuine vitreous china—a smooth, hard, permanently non-absorbent material with a surface glaze which provides lasting beauty and makes cleaning easy. Genuine vitreous china is a unique product, combining as it does the art and skill of the potter with the mechanical ingenuity of the Master Plumber.

The materials that go into its manufacture include different types of china clays, ball clays, ground flint, and ground feldspar. Each item has certain properties, all of which are necessary to produce satisfactorily finished products. For example, flint contributes to the hardness and strength. Feldspar is a fusing and binding ingredient, forming a dense, non-porous and non-absorbent "body." Precisely measured quantities of these ingredients are carefully processed, molded, and fired at extremely high temperatures to form smooth, lustrous, non-absorbent genuine vitreous china plumbing fixtures.

ENAMELED PLUMBING FIXTURES

Today's neat, efficient lavatories also are made of genuine vitreous china—and of enameled cast iron. The latter type construction is another triumph of engineering skill, for plumbing fixtures of cast iron enemelware are a combination of two very dissimilar materials—a metal and a glass—which provides the durability and hardness of glass, and the rigidity and strength of cast iron.

The glass-like coating called "enamel" consists of many materials, each serving a specific purpose. Some are used to equalize as closely as possible the expansion and contraction of the enamel with that of the iron; some to bring the melting point of the mixture to the proper degree of temperature; some to give the correct amount of opacity and lustre to the ware. Such materials as feldspar, borax, quartz, soda ash, nitrates, and metallic oxides in minutely exact proportions are made into a powder, several coats of which are applied to the hot cast iron of the fixtures and fired until the plumbing fixtures are covered with a thick, lustrous coating of enamel.

A further advancement in the field of enameled cast iron plumbing fixtures is the development of acid-resisting enamel. This material, by a variation of its ingredients, is made to withstand the action of strong acids which may come

in contact with the surface of the fixture and which are likely to stain or roughen regular enamel. However, both finishes have superior durability and permanency of gloss.

CHROME PLATE FOR FITTINGS

Applied research and accumulated knowledge also have resulted in fittings which are unexcelled for durability, efficient operation, and good looks. Quality fittings are constructed of brass because this alloy, being composed of non-ferrous metals, will best resist the corrosive effects of water. In addition, brass is particularly adaptable for polishing and buffing and for electroplating with nickel or chromium.

Brass is a metallic alloy which usually contains copper, zinc, lead, and tin—the largest percentage being copper. The exact proportions are varied according to the use intended. For example, a part requiring resistance to wear from movement or friction needs a different metallic structure, and hence a different proportion of ingredients, as compared with parts not subject to movement.

The parts of brass fittings which are visible after installation are electroplated to achieve color, lustre, durability, and greater resistance to wear, tarnish, and corrosion. As nickel is harder and remains bright longer than brass when exposed to ordinary atmospheric conditions, it is used for plating. Chromium plate is superimposed on this nickel coating, as its resistance to tarnish is much superior and its color more attractive. This heavy, tarnish-proof finish is unexcelled for durability, beauty, and ease of cleaning.

FINE FIXTURES, LONG SERVICE

But the real test of any plumbing fixture is in the service it provides. Because washrooms contribute so much to the comfort and convenience of theatre patrons and because they represent a real investment in good will, it is important for the prospective owner or builder to make certain the plumbing fixtures installed will render efficient service and retain their beauty through the years.

Unfortunately, the excellence of plumbing fixtures often cannot be judged by appearances. Some of the factors that are necessary to the manufacture of truly fine plumbing fixtures—ingenious design and engineering, highest quality materials, skilled workmanship, and years of manufacturing experience—are not readily apparent. Aside from actual service tests the only way to evaluate quality is by destructive laboratory tests during which plumbing fixtures are subjected to strong acids, cut into sections to determine the thickness of their enamel coating or their qualities of non-absorbency, and similarly tested in countless other ways.

Since such tests are impractical for the purchaser, he must rely on the experience and reputation of a well-known manufacturer and on the advice of a Master Plumber. The Master Plumber can best recommend plumbing fixtures of finest quality—the fixtures backed by the name of a dependable manufacturer, by many years of research and manufacturing ability, and by the maker's sincere desire to serve the public's health and comfort.

RELY ON A MASTER PLUMBER

The purchaser should avail himself of the services of a Master Plumber to install the plumbing fixtures. He is the man best qualified by his knowledge and experience to make a neat and accurate installation which will conform to municipal requirements and general standards of sanitation. He also can do much to assure trouble-free service.

Furthermore, when the purchaser relies on a Master Plumber to install plumbing, he can be sure of getting the four-way health insurance his city provides whenever plumbing is installed, repaired, or altered. First, before anyone can legally engage in the plumbing business, he must establish his competence by a rigid examination, and get his license from the city. Second, he must follow certain methods when doing the work. The "plumbing code" is the method citizens use to tell plumbers how they must guard against pollution and health hazards in their work. Third, the plumber must obtain a permit, issued by the city, before he begins each job. Fourth, the city follows up each permit when the job is completed, and inspects the installation to insure that the methods the plumber uses are the correct methods.

To overlook these safety requirements is taking a chance with the health of

THE PURCHASER of plumbing fixtures must rely on the experience and reputation of a well-known manufacturer and on the advice of a Master Plumber. Such fixtures as the Tribor water closets and Expello urinals, shown here, is the type of equipment backed by a dependable manufacturer and his sincere desire to serve the public's health and comfort. The Master Plumber is best qualified to make a neat and accurate installation which will conform to municipal requirements and general standards of sanitation, and he can do much to assure the theatre owner of trouble-free service.



theatre patrons—and perhaps with the health of the community. Also, improperly installed plumbing often results in annoyance and unnecessary expense. For instance, one faulty joint may force costly redecoration. One error in judgment as to location of water inlets may subject the entire plumbing system to pollution through back flow. One mistake in pipe sizing may give only a trickle instead of a good flow of water. One loose pipe may cause irritating noises when a faucet is rapidly closed.

The Master Plumber also knows how to install plumbing for utmost convenience in maintenance. For example, he can install stops in the supply lines to individual fixtures to permit the shutting off of any fixture without interrupting the operation of others in case some trouble should develop. These stops also are useful in regulating high water pressure to prevent annoying splashing.

CALL HIM FOR REPAIRS, TOO

After the plumbing fixtures are installed, it is desirable to have the Master Plumber make regular check-ups of the washrooms. He will be able to spot the places which may require adjustment, repair, or replacement in order to assure continued efficient operation.

Usually a plumbing system goes along, day in and day out, giving perfect service. Yet when tampered with by the unskilled handyman, the putterer, or the incompetent pipe fitter, it may weaken, with shocking results. There is but one way to be sure of keeping plumbing pure—by calling a competent Master Plumber for even the smallest repair.

GIVE FIXTURES REGULAR CARE

The theatre manager himself can do much to prolong the life and beauty of plumbing fixtures and fittings by seeing that certain fundamental principles of care and cleaning are followed.

(1) **Keep fittings free from leaks.** Have leakage repaired immediately. Even the finest ceramic materials sometimes can become permanently stained by minerals in the water dripping from leaking faucets.

(2) **Clean fixtures often.** Accumulations of dirt and stains may become increasingly difficult to remove. It is good practice to have an attendant clean up the washrooms during periods of least use throughout the day, so that a high standard of cleanliness will be maintained. Mild soap and hot water applied with a good bristle brush are the best cleaners. Accumulations of grease and dirt can be removed with a solution made by dissolving a half bar of naphtha-base kitchen soap in a quart of water and adding two tablespoons of kerosene. When stains are not easily removed with this solution, a non-gritty abrasive cleanser should be used. Sift a small amount of this cleanser on a damp cloth and apply it to the surface. Then rinse, and polish with a dry cloth.

(3) **Avoid use of cleansers containing coarse abrasives.** Use of abrasive cleansers may result in scratches in the smooth surfaces of plumbing fixtures. Such scratches will tend to catch dirt and make cleansing more difficult. Excellent commercial special-purpose cleansers are available and should be used according to instructions on the container.

(4) **Guard against sharp knocks from hard materials.** Dropping a hard object on an enameled or genuine vitreous china surface can cause nicks and cracks which are irreparable. In women's washrooms, provision of a make-up shelf and mirror separate from lavatories will tend to reduce causes of this danger.

(5) **Clean fittings regularly.** Chromium plated fittings are easily kept bright with ordinary soap and water. No polishing powders or pastes should be needed. An important safeguard is to keep acids such as muriatic, which is commonly used by tile setters and which dissolves chromium, away from fittings.

SUMMARY

By trusting a reliable manufacturer for quality plumbing fixtures, by depending on the Master Plumber for proper installation and repair, and by seeing that fixtures get regular care and attention, the manager can be sure washrooms in his theatre will create a lasting impression of cleanliness and consideration that will bring patrons back again.

Moreover, he will discover that attractive, well-equipped washrooms are more economical to maintain. Experience proves that such rooms tend to discourage carelessness and misuse. Equipment lasts longer and cleaning is easier.

THE REAL TEST of any plumbing fixture is the service it provides. Because washrooms contribute so much to the comfort and convenience of theatre patrons and because they represent a real investment in good will, it is important to make certain the plumbing fixtures will render efficient service and retain their beauty through the year. The Buena lavatories and Madstone urinals pictured here are examples of modern fixtures, based on ingenious design and engineering, highest quality materials, skilled workmanship, and years of manufacturing know-how and practical experience.

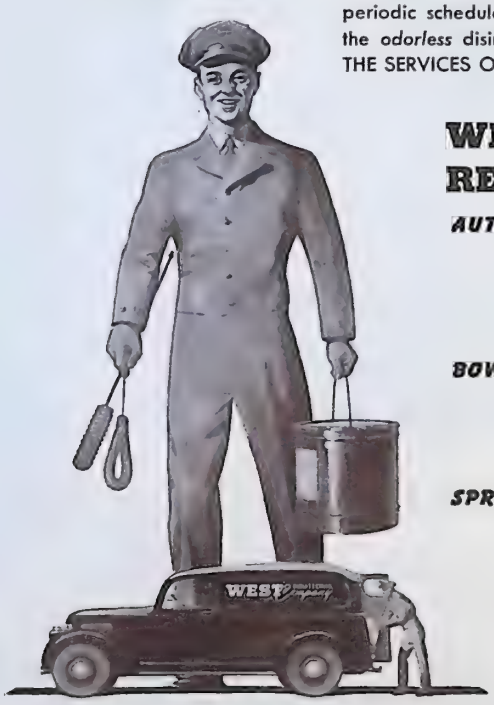


PROPER WASHROOM SANITATION

The West Disinfecting Company occupies a singular position in its field, since it offers such a complete line of products and services for the promotion of washroom sanitation and personal cleanliness and has been a leader in the promotion of public health for over half a century.

THE WEST WAY IS THE BEST WAY
A WASHROOM MAINTENANCE SERVICE

To supplement the regular duties of your janitors, *specially trained West Service Men,* experienced in using proper disinfecting and deodorizing materials in the most efficient manner service your washrooms on a regular periodic schedule. The cost is surprisingly low. Your purchase of Westamine, the *odorless* disinfectant, West Bowl Cleaner and West Deodorants INCLUDES THE SERVICES OF WEST SERVICE MEN WITHOUT ADDITIONAL CHARGE!



WEST'S TRAINED SERVICE MEN REGULARLY TAKE CARE OF . . .

AUTOMATIC DEODORIZATION

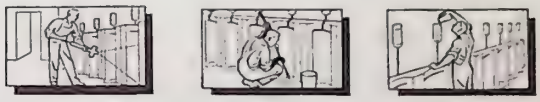
The West Automatic Drip Machine is designed to meet a need of proper washroom deodorization in a simple, economical and efficient method. When placed above toilets and urinals, an aromatic liquid constantly drops into the bowl, tending to overcome washroom odors at the source. This machine also deodorizes the air of the entire washroom. West Service Men inspect and refill these automatic devices as required.

BOWL CLEANING

Even over a comparatively short period of time, traps of toilet bowls and urinals collect certain salt and sugar secretions, causing offensive odors and unpleasant conditions. West has developed a special material which West Service Men use to perform the necessary job of heavy duty cleaning.

SPRAYING WITH WESTAMINE ODORLESS DISINFECTANT

WESTAMINE is an odorless disinfectant used by West Service Men, especially designed for the routine spraying, cleaning and scrubbing of washrooms. It is especially prepared to fulfill the demand for a spray fluid of definite bacteriological strength without an odor.



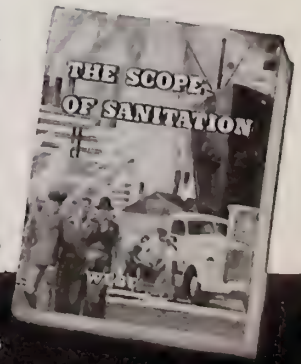
LIQUID SOAPS — Made of pure vegetable oils, treated, aged and laboratory tested. Small quantities suffice to wash and cleanse thoroughly without irritating or drying skin. West manufactures a liquid soap for every requirement.

DISPENSERS — West's standard of merit and attractiveness of design are evident in individual dispensers of all types, including Tilting, Pump valve, or Basin Types. West also installs SOAPARATUS SYSTEMS whereby one tank may serve one or two valves in small washrooms or a battery of 50 basins in larger washrooms.

PAPER TOWELS — Manufactured in West's own paper mill. Laboratory tested for absorbency and strength without sacrificing the "good feeling" that the user has a right to expect.

KOTEX VENDING CABINETS *(Coin Operated)* — Exclusively distributed by West.

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ELECTRIC-AIRE EVAPO-DRYER for the HANDS

Backed by 23 years of engineering research, testing and experience.
Offers 12 distinct advantages:

1. Preserves architect's and owner's original conception of attractive, modern, serviceable washroom.
2. Eliminates marring of tile and marble in mounting towel cabinets; also scratching of walls through careless handling of soiled towel containers.
3. Attractively clean washrooms — NO SOILED TOWEL LITTER.
4. A continuous, automatic drying service without attention of janitor or maid.
5. A sanitary service—no soiled "end of towel" hanging from empty cabinet to spread disease from one user to another.
6. Eliminates a DANGEROUS FIRE HAZARD in the accumulation of soiled paper towels.
7. Removes the chief cause of clogged toilet bowls — paper towels.
8. Insures a continuous, enduring, efficient service. Paper shortages can never interrupt your drying service.
9. Eliminates unsightly and space-consuming containers for soiled towels.
10. ELECTRIC-AIRE offers thorough drying which PREVENTS CHAPPED AND ROUGHENED HANDS.
11. Eliminates constant buying, storing, distributing, collecting, and disposing of paper towels, or servicing and rental on cloth towels—and accounting cost on either.
12. ELECTRIC-AIRE saves from 90 TO 95% over any other type of drying service, quickly amortizing its original cost.

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Manufacturers and Distributors of Quality Hand and Hair Evapo-Dryers

* Reg. U. S. Pat. Off.

PROJECTION *and* SOUND

1947-48

DeVry's 12000 Series Projection Equipment

Projector Mechanisms, Bases, and Changeovers Redesigned for Large and Drive-in Theatres

E. W. D'Arcy
DeVry Corporation

The DeVry 12000 Series of 35-mm. motion picture projection equipment (Figure 1) includes a new design of projector head, new designs of projector bases, amplifiers in various powers up to 250 watts, and speakers designed to accommodate theatres of maximum size to the drive-in theatre speaker usable within a car.

PROJECTOR HEAD

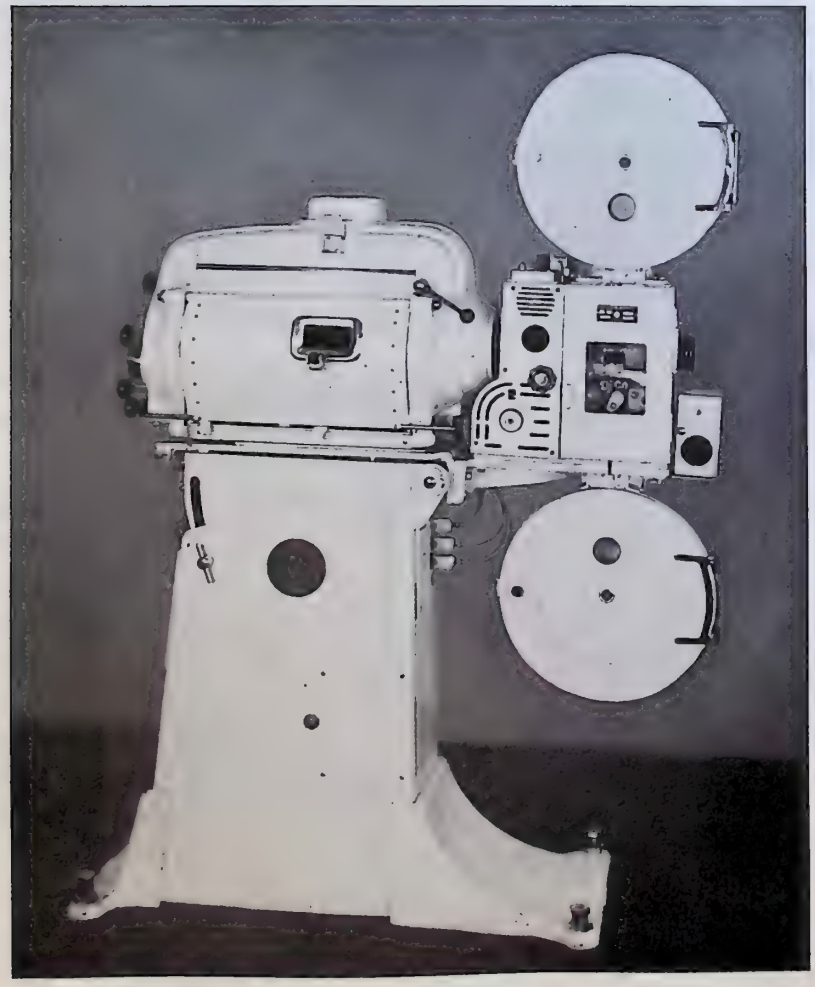
The projector mechanism head incorporates the sound head components usually supplied in a separate unit.

This basic construction allows for great economy and maximum simplification of the mechanical drive for all of the projector functions. The projector head itself is aligned and secured to a mounting plate in such a manner as to permit rapid head replacement in correct projection alignment in case of need, and the switchover from defective head to replacement head can be accomplished very rapidly.

Securement of Parts

The basic components utilized in the mechanism construction are protected against corrosion or rust by suitable platings or the use of corrosion resistant material. Assembly of parts to the main mechanism plate is with through bolting where possible or mechanical locking devices of various approved types.

FIGURE 1—The 12000 Series of 35-mm. motion-picture projection equipment of the DeVry Corporation includes a new design projector head and new designs of projector bases, as well as amplifiers in various powers up to 250 watts, and speakers designed to accommodate theatres of maximum size to the drive-in theatre speaker. The projector head incorporates the components of the sound head.



Basic Construction

The 12000 projector head is built around a main center mounting plate of normalized aluminum of adequate cross-section to guarantee permanent correct alignment of the optics, sprockets, intermittent mechanism, sound head, and so forth.

All of the power driving mechanism is mounted on the non-operating side of the mechanism main frame and is accessible for service or inspection by a latched, hinged door. Conversely, all of the film handling equipment is mounted on the operating side of the mechanism plate and it, too, is accessibly by a latched, hinged door in which a fire resistant glass port is installed for inspection of the proper operating loops during projection.

Intermittent Movement

The intermittent movement (Figure 2) is of the 90-degree Geneva-cross type, the cam and star operating in an oil chamber. The entire intermittent movement is readily replaceable and is doweled to the framing mechanism so that proper timing may be maintained when removed for inspection, repair or replacement. Lubrication of shaft bearings is by oil canals ground on the shaft, oil feeding from the reservoir. Final end performance of the intermittent is such as to result in a projected picture jump of less than 0.25 percent at a 100 foot projection distance.

Framing

One hundred percent synchronous framing is accomplished in an ingenious manner, utilizing the chain drive feature (Figure 3) so as to maintain perfect synchronization between the star and cam crossover point and the shutter position. This is accomplished by rotation of the intermittent housing and sprocket around the intermittent sprocket axis through sufficient angle to allow framing over two picture frames.

Synchronization with the shutter is accomplished by synchronizing the rotary movement of the intermittent housing with two vertical moving chain idlers so as to maintain the same effective distance with respect to chain length between the crossover point of the star and cam and the correct shutter position for 100 percent synchronization.

Film Rails

Film rails (Figure 4) on which the film rides at the aperture are made of hardened ground stock that is then chrome plated to reduce frictional resistance, thus allowing the maintenance of adequate tension on the film during

projection and insuring a steady projection without undue strain on the film perforations. Edge guiding flanged rollers are mounted at the top of the film rails and are hardened and of adequate diameter to insure a solid film guide to the correct lateral position. Side sway is also held to less than 0.25 percent at a 100-foot projection distance.

Projection Film Shoes

Film is held securely to the film rails by means of film shoes (Figure 4) from a position well above the aperture to the intermittent sprocket. This is accomplished by three pressure shoes, the aperture film shoe being adjustable in pressure to allow compensation for various conditions of film and can be adjusted during projection. The intermittent sprocket pressure shoe holds the film on the intermittent sprocket and guarantees a four-tooth engagement with the sprocket at all times. Clearances between the individual shoes, as illustrated in (Figure 4) are of the order of 1/16 inch and this nearly 100 percent film contact with the rails guarantees freedom from film slap, thus aiding in the reduction of film jump or weave.

Film Shoe Gate Assembly

The assembly plate mounting all of the four tension shoes is removable by a single knurled thumb nut for cleaning purposes and is positioned by guide pins to insure correct replacement alignment in the operating condition. All springs used for the gate assembly are tested thoroughly as to tension.

Power Drive

All power is transmitted in the 12000 Series of projectors by means of silent chain drives, which drives accomplish a positive mechanical drive system additionally allowing rapid replacement of worn assemblies without the necessity of skilled mechanical craftsmanship.

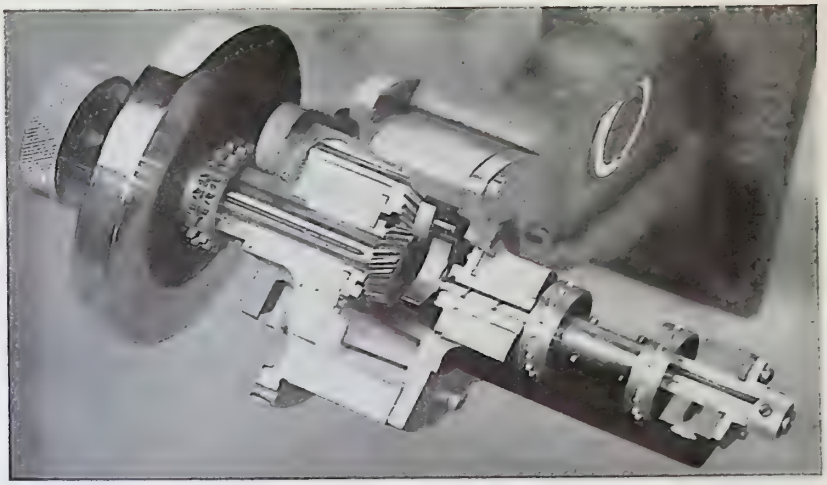
The chain-drive system, as such, has been field tested throughout a 15-year period and has certainly proven its dependability and long life in actual operation, over 10,000 projector mechanisms having been made with this drive system, to the users' complete satisfaction.

Power Source

The main driving motor normally supplied is a ⅓ hp., split-phase, self-starting, single-phase induction motor, statically and dynamically balanced, and so adjusted as to starting characteristics that no undue strain is placed on the film or mechanism during acceleration to operating speed.

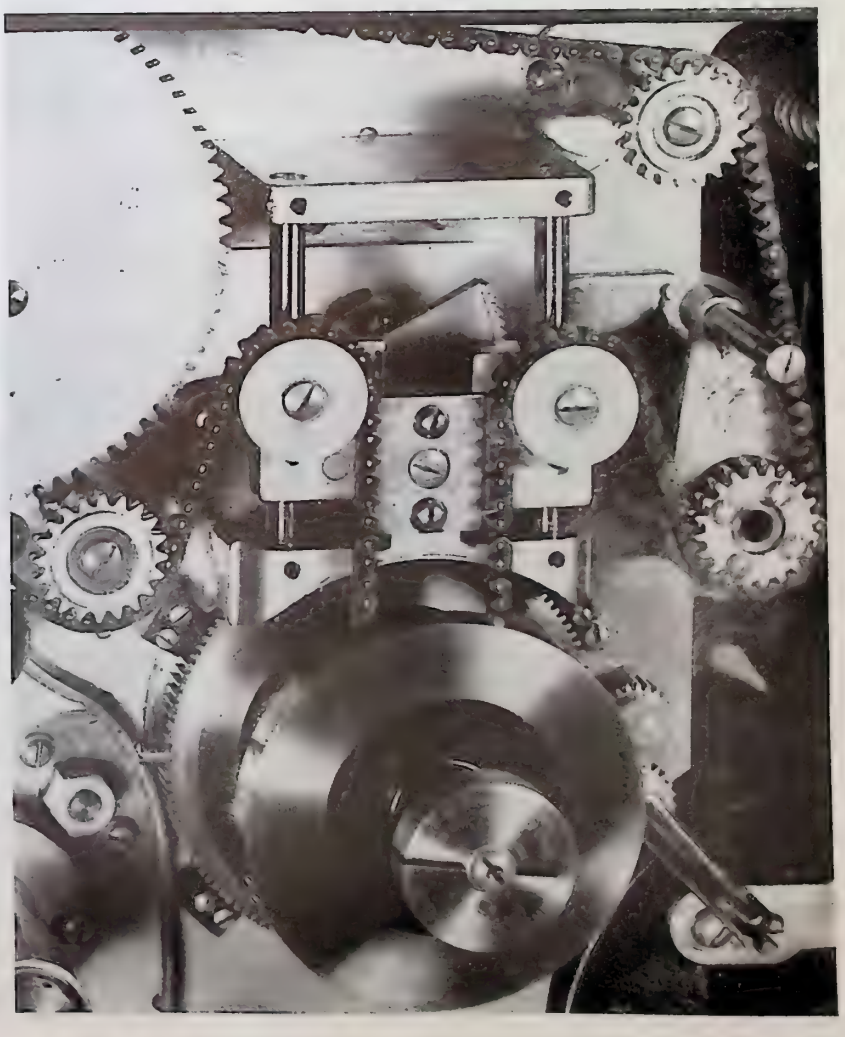
It will function satisfactorily between voltage variations of 110 to 120 volts and at these variations operates with less than 0.5 percent variation in the mean speed of the film.

Other special purpose motors are available for the operation of the projector in all field conditions from 25 cycles to 100 cycles. This line of a.c. motors is implemented by governor controlled types of universal characteristics which guarantee correct performance of the projector over wide voltage variations such as are encountered in poorly regulated power areas, both domestic and foreign. In all cases motors are adjusted as to acceleration characteris-



FIGRUE 2—The intermittent movement is of the 90-degree Genova cross type, the cam and star operating in an oil chamber. The entire movement is readily replaceable and is doweled to the framing mechanism so that proper timing may be maintained when removed for inspection, repair, or replacement. Lubrication of bearings is by oil canals ground on the shaft, oil-feeding from the reservoir.

FIGURE 3—One hundred percent synchronous framing is accomplished in an ingenious manner, utilizing the chain drive feature so as to maintain perfect synchronization between the star and cam crossover and the shutter position. This is accomplished by rotation of the intermittent housing and sprocket around sprocket axis through sufficient angle to allow framing over two picture frames.



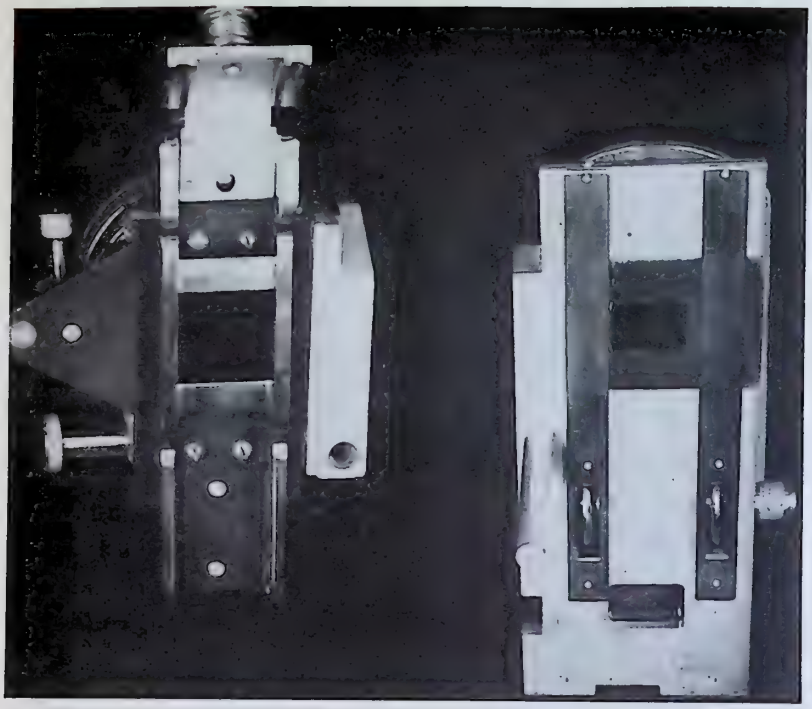
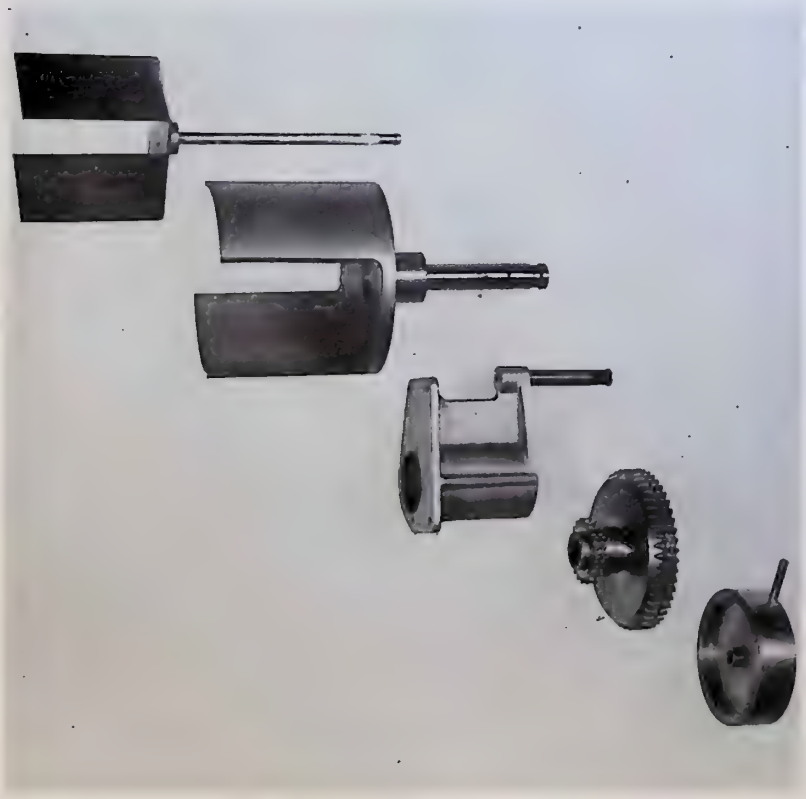


FIGURE 4—Film rails on which the film rides at the aperture are made of hardened ground stock that is then chrome plated to reduce frictional resistance, thus allowing the maintenance of adequate tension on the film during projection and insuring a steady projection without undue strain on the film perforations. Edge guiding flanged rollers are mounted at the top of the film rails and are hardened.

FIGURE 5—The shutter utilized in the 12000 Series of projectors is of the barrel type, running at 1,440 r.p.m. and is, therefore, of rugged construction, with its driving shaft extended through a bearing housing at the rear of the mechanism. The film shutter assembly is supported on roller bearings mounted in the bearing housing assembly, silicone high-temperature grease being used as the lubricant.



tics to equal that of the standard motor normally supplied.

Shutter System

The shutter (Figure 5) utilized in the 12000 Series of projectors is of the barrel type, running at 1440 rpm., and is of rugged construction, with its driving shaft extended through a bearing housing, to the rear of the mechanism. The film shutter assembly is supported on roller bearings mounted in the bearing housing assembly, silicon high temperature grease being used as a lubricant. The shutter is mounted between the light source and the aperture and is of slightly more than 50 percent transmission efficiency.

Of course, the inherent advantage of the barrel shutter with reference to double light cutoff is well known with respect to flicker reduction.

Fire Shutter

The fire shutter assembly is integral with the major shutter and functions by means of centrifugally operated weights with rawhide inserts, which transmit power between the film shutter main shaft assembly and the fire shutter shaft.

The arrangement works infallibly under all conditions of temperature or oil seepage.

The fire shutter is set to open or close at a film velocity of 50 feet and its roller bearings are silicone grease sealed type capable of withstanding high temperature operation.

Sprockets

All sprockets are hardened and ground and are in accord with the standard dimensions of the Society of Motion Picture Engineers.

Lens Focusing Mount

Projection lens focusing (Figure 6) is accomplished by a micrometer screw located outside the projector case with the lens focus lock located inside the projector case, guaranteeing permanent, accurate projector lens focusing. The focusing mount lens holder barrel extends through the projector case so as to allow the clamping of a preset focus ring onto the objective lens, allowing rapid replacement in focus registery when lens removal for cleaning is required.

The projection lens focusing device is screw driven and slides on a rod of adequate section in a straight line motion, guaranteeing no shift of picture position on the screen during all focusing operations.

Projection Lenses

Projection lenses are supplied in Series II, in all focal lengths from 3½ to 9¼ inches and are coated so as to achieve maximum efficiency in light transmission. The formula on which these lenses have been designed have been time tested through many years of experience in the manufacture of high speed, high resolution projection lenses. The lenses are free from halo effects, and suitable interior lens barrel blackening, with the addition of coating, guarantees an efficient, high-contrast, snappy picture.

Film Magazines

The magazines are made of sheet metal spinnings, mounted on cast aluminum support frames in which is mounted the fire trap roller assembly. This assembly is comprised of two floating, hardened and ground rollers, gravity held against a single accurately positioned main trap roller. Clearances between rollers and film is held to less than 0.005 inch, guaranteeing effective fire trap action.

Feed reel holdback tension is adjustable by means of a knurled tension nut compressing the holdback spring against a washer type brake clutch assembly.

Takeup power is transmitted through a chain drive from the projector mechanism to the constant torque clutch assembly, mounted on the takeup spindle shaft. Takeup film tension is of a designed value and is not field variable.

Torque uniformity is such as to accommodate any reel size up to 2,000 feet capacity.

Film magazines and fire traps have been approved by the Underwriters Laboratories and the various state approval agencies.

Lubrication

Projector lubrication is by both oiling and greasing. A single point visible oiling system serving the oiling requirements and Alemite fittings are used for the greasing points. The system is of a gravity feed visible reservoir type and feeds all bearing assemblies requiring the lighter type of lubrication.

Silicone grease is used in the shutter assembly and this is supplied every 500 hours by means of an Alemite gun.

Pad Roller Assembly

The sprocket pad roller assembly (Figure 7) is mounted integrally with the sprocket shaft housing assemblies and its operation is that of a lever arm, its final position determined by a spring motivated plunger pressing into adjustable registry points located on the sprocket shaft housing assembly. The pad rollers themselves are removable for cleaning or replacement from the operating side of the projector by the removal of the pad roller operating knob which releases the front pad roller bearing plate. The pad rollers are made of hardened and ground steel and are set so as to allow ample clearance with the sprocket teeth.

The operating means for the pad roller is of adequate size to insure long life and ease of operation.

Projector Switching

All projector switching is accomplished in a terminal box located at the top of the mechanism case (Figure 8) and these facilities consist of a motor switch, framing light switch, and changeover button. This location places all changeover operations within the span of a hand. This eliminates the spread-out switching method so commonly used, with its attendant operating difficulties. This method of switching was incorporated at the request of many operators who felt that something could be done about eliminating the two hands and one foot requirements of projector changeover operation.

H. I. Head Cooling

An adjunctive ventilation unit is supplied for high intensity arc operation, acting to both cool the film rails and film to such a degree as to render the use of a heat filter unnecessary and in that manner guarantee maximum light on the screen. The temperature of the rails under 80-ampere, high-intensity projection conditions is reduced to less than 120 degrees at the end of a 20-minute period of operation. Ventilation is accomplished in a pressure blast and exhaust manner by both a blast of air directed across the aperture, film rails and film in such a manner as to not cause film disturbance during projection and still carry the heat away from the film, aperture and rails to a loctaion where the head heat exhaust fan is effective. This additionally removes heat radiated from not only the aperture rails and baffles, but from the shutter as well. Film cooling is quite effective by this means an a substantial increase in film life is obtained, as compared with conventional methods of film projection.

The head ventilation is supplied as an adjunctive unit, complete in itself, and readily attachable to all 12000 projector heads.

Scanning Mechanics

The sound head portion (Figure 9) of the projector is built around an internally stabilized flywheel filter system utilizing a coupling fluid relatively uniform in its performance over wide variations of temperature. This rotary stabilizer functions in conjunction with the film loops as established for its correct operation so effectively as to reduce speed variations or flutter to less than 0.25 percent of the mean operating speed.

FIGURE 6—Projection lens focusing is accomplished by a micrometer screw located outside the projector case with the lens focus lock located inside the projector case, for permanent, accurate projector lens focusing. The focusing mount lens holder barrel extends through the projector case.

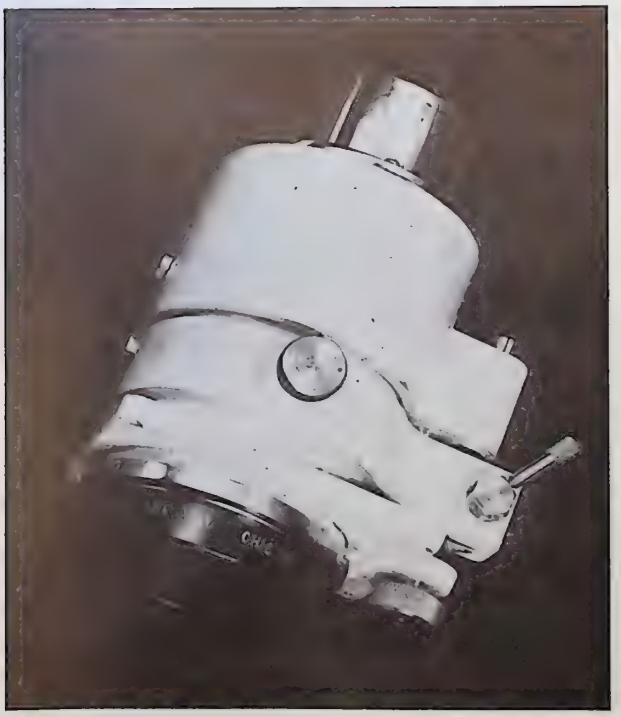
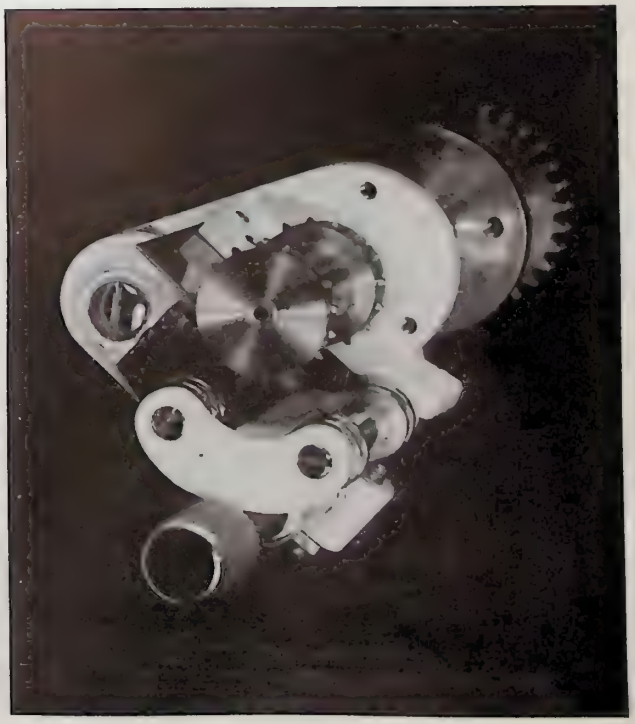


FIGURE 7—The sprocket pad roller assembly is mounted integrally with the sprocket shaft housing assemblies and its operation is that of a lever arm, its final position determined by a spring-motivated plunger pressing into the registry points located on the sprocket shaft housing assembly.



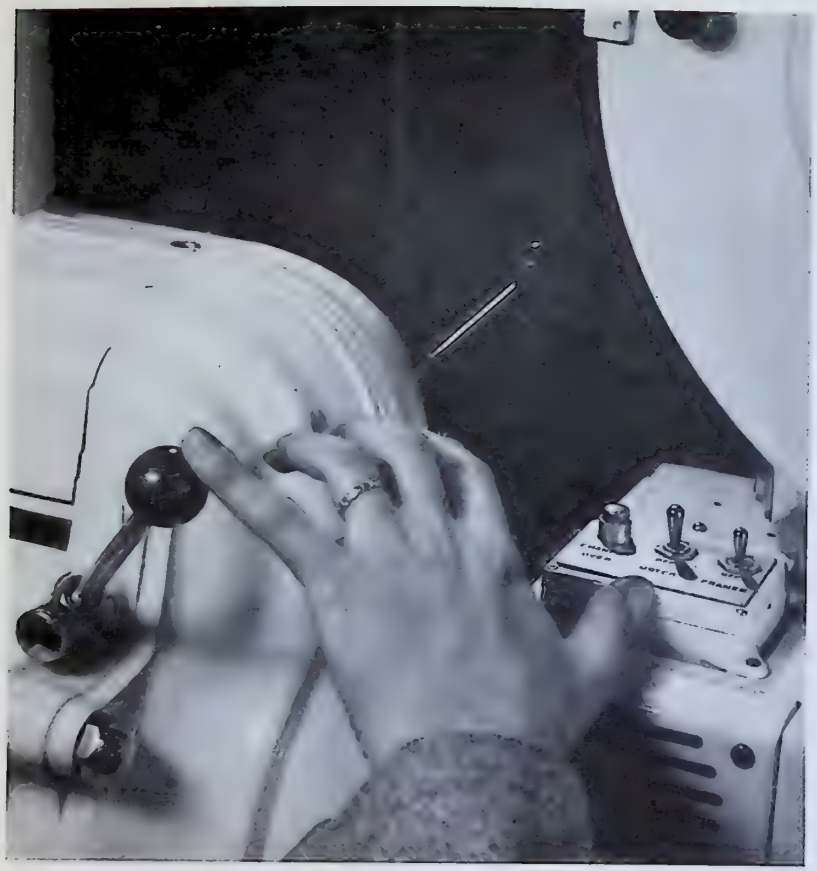
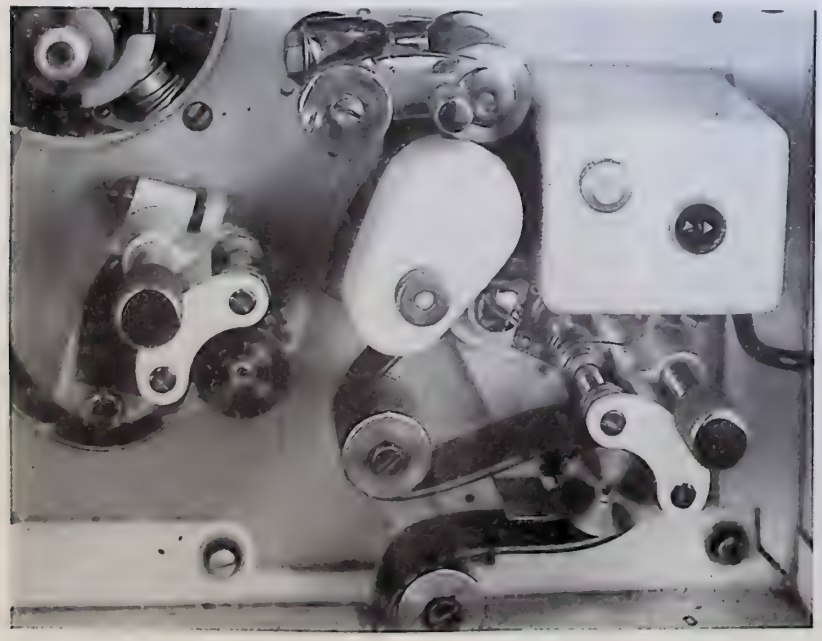


FIGURE 8—All projector switching is accomplished in a terminal box located at the top of the mechanism case and these facilities consist of a motor switch, framing light switch, and changeover button. This location places all changeover operations within the span of a hand. This eliminates the spread-out switching method so commonly used, with its attendant difficulties in operational procedure.

FIGURE 9—The soundhead portion of the projector is built around an internally stabilized flywheel filter system utilizing a coupling fluid relatively uniform in its performance over a wide range of variations of temperature. The rotary stabilizer functions in conjunction with the film loops as established for its correct operation so effectively as to reduce speed variations to less than 0.25 percent.



The mass weight and the weight ratio between the shell and its internal inertia wheel is such as to allow full stability of filtering to be reached in less than 5 seconds. In explanation of its filter performance, the film is isolated from intermittent sprocket fluctuations by a combined isolation and feed sprocket feeding the film to the sound drum, with its associated scanning components. The holdback sprocket for the takeup reel serves a dual purpose as the sound sprocket.

The film path between this combined sound and takeup sprocket passes around an idler roller in such a manner as to form two film spring elements of great effectiveness in increasing filter efficiency. The entire bearing assembly for the sound drum and flywheel combines into a readily replaceable unit featuring again rapid equipment serviceability. Figure 9 demonstrates the compactness and field serviceability of the entire assembly.

Sound Track Adjustment

Film lateral adjustment is obtained by movement of the pressure pad roller holding the film in secure contact with the sound drum laterally and providing a means to secure this adjustment permanently by a locking screw. The pad roller additionally is supported on conical bearings which guarantee long life, a low frictional impedance, and low mechanical noise factor.

Edge Guiding

An additional adjustment is supplied in the pad roller bracket assembly for adjusting the tension upholding the film on the sound drum in such a manner that a component of force exists forcing the film to guide against the sound track side of the pad roller flange.

This eliminates the necessity of splitting the pad roller and applying direct pressure to the film for guiding.

Sound Optics

The sound optics (Figure 10) is of a type utilizing a cylindrical reduction lens system with the photoelectric cell located inside of the sound drum. This allows full use of all of the illumination transmitted through the film and eliminates the necessity for condensers or mirrors between the film and photocell. Figure 10 shows the location of the components.

A 6-volt, 1-ampere lamp of pre-focus type is utilized for the light source and is held in fixed relationship to the cylindrical reduction lens system. It eliminates exciter alignment problems and guarantees rapid, correctly registered replacement of exciter lamps in case of burnouts.

The cylindrical reduction lens system is adjustable from the front of the projector mechanism both as to focus and azimuth. As can be seen, all mechanical parts, slit system, photocell and exciter lamps are readily accessible from the front of the projector for replacement or inspection.

The photocell used is of the type CE25 and is protected from electrical disturbances by adequate shielding. The photocell wires are led to the outside of the projector case by a low capacitance neoprene type cable, where it terminates in

either a pre-amplifier or, in some cases, to an extension cable for the wall type of amplifier.

In performance, the optics allow the recommended Academy of Motion Picture Arts and Sciences curve to be produced with a noise level, projector operating, of less than 60 db. below normal operating power level. A frequency response curve illustrating the overall performance of the sound head is given in Figure 11. This curve is of slit performance alone and illustrates the frequency response obtainable with the cylindrical reduction lens system.

PROJECTOR BASES

The projector base supplied as standard with the 12000 Series equipment is shown in Figure 12 and is available in either the table training or non-training types. It consist essentially of a welded frame to which front and rear mounting base castings are attached. The center of gravity and weight is so adjusted that a balance point for the completely assembled projector falls behind the table pivot bar and underneath the arc lamp. Adjustment of the projector as to azimuth is obtained by a hand wheel mounted inside the base frame and is accessible by removal of a side panel. Bases are locked in operating position by two hand wheels on either side of the base main frame, locking into the table apron, which extends downward in the mechanism frame housing. The table consists of a front and rear casting of adequate section and is available in both training and non-training types. The arc, rectifier starting switch and carbon repository are mounted in the rear of the projector base.

All wiring is brought to a terminal box (Figure 13) located in the front of the base, which is accessible by the removal of its cover plate. A trouble light outlet receptacle is mounted directly below the terminal box. Plugs are mounted in the mechanism base, facilitating rapid disconnection of the projector head itself.

The front table casting is removable from the rear table by bolts and other front tables are supplied meeting various conditions of projector base usage. The base is four-point leveling and when leveled, is held to the projection booth floor by expansion bolts, and so forth, which are spotted through the leveling screws themselves.

The exciter lamp supply is mounted in the base itself and consists of a selenium rectifier unit rapidly replaceable with good regulation and low ripple content.

CHANGEOVERS

Changeovers supplied with the projector head are of the zipper type and can be operated manually from either side of the projector for emergency use in case of solenoid failure. Projector heads are wired so that no master projector is required and straightforward conventional changeover wiring is used with the exciter lamps being utilized for the sound changeover, photocell outputs and preamplifiers being in an operating condition at all times. Facilities are available in the base terminal box for the attachment of floor foot switches in case that should be preferred over the press button available in the projector head.

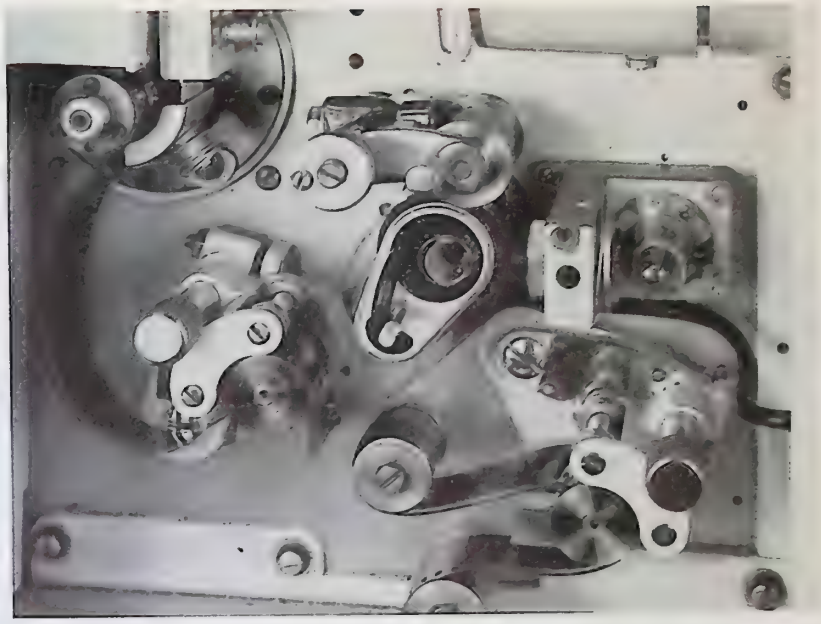


FIGURE 10—The sound optics is of a type utilizing a cylindrical reduction lens system with the photo-electric cell located inside the sound drum. This allows full use of all of the illumination transmitted through the film and eliminates the necessity for condensers between the film and photo cell. A pre-focus lamp is used as the light source is fixed in relation to the reduction lens system.

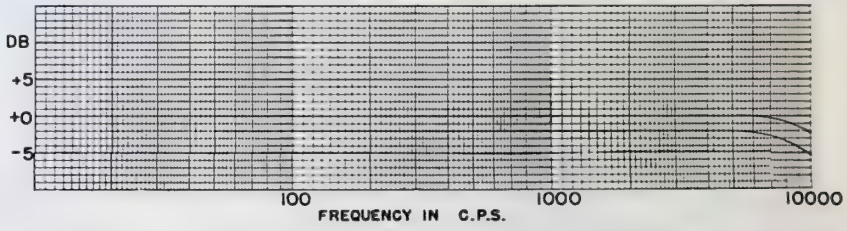
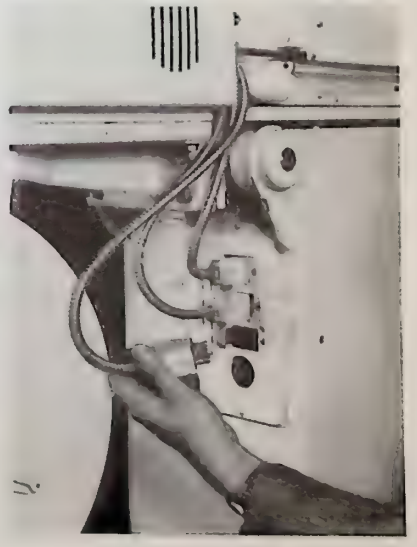


FIGURE 11—A frequency response curve illustrating the over-all performance of the soundhead is given here, showing the upper and lower limits of 0.00075-inch high scanning beam. The curve is of the slit performance alone and illustrates the frequency response (in decibels) over the range of 60 cycles to 10,000 cycles a second, obtainable with the cylindrical reduction lens system of the 12000 Series.

FIGURE 12—The projector base is available in either the table training or non-training types. It consists essentially of a welded frame to which front and rear castings are attached.



FIGURE 13—All wiring is brought to a terminal box in the front of the base, which is accessible by the removal of its cover plate. Plugs are mounted in the base for easy disconnection.



Blue Seal's Superior Model A Projector

New Equipment Said to Embody Developments For Scientific Motion-Picture Projection

J. Burgi Contner
Blue Seal Cine Devices, Inc.

Blue Seal Cine Devices, Inc., manufacturers of high quality sound-on-film recording equipment since 1929, are the makers of the new Superior Model A 35-mm. projector. Following is the company's textual presentation:

The older Model X and U projectors were manufactured by the Coxsackie Holding Corporation of Coxsackie, New York, since 1922. At the beginning of the war they disposed of their plant and Blue Seal Cine Devices, Inc., purchased the rights, patents, and tools. J. Burgi Contner, president and chief engineer of the Blue Seal, redesigned the projector to the present Model A, retaining all of the finer qualities of the former projector and modernizing it to contemporary design and embodying all the advanced scientific development for modern day projection. (Figure 1.)

The exterior appearance is attractive and finished in gray morocco (Figure 2) which matches other components necessary to assemble a complete projector. The film side (Figure 3) is roomy, easy to clean and service. The micrometer focusing large-size lens mount accommodates the new high-speed coated lenses without the use of adapters. The aperture plate is one-piece, hardened-and-ground construction. There are two sets of hardened-and-ground film shoes. The upper shoes effectively snub patches while the lower ones are long enough to hold the film flat during the period that the film is at rest in the aperture. Dual pad rollers are used on both upper and lower sprockets. The Model A combination framing and pilot lamp is provided.

The drive side (Figure 4) is of simple straightforward design eliminating all unnecessary gearing. The vertical shaft carries the ball-type governor which controls the fire shutter. The rear shutter is driven directly from the cam shaft eliminating back lash and shutter oscillation.

Intermediate and main drive gears (Figure 5) revolve on fixed hardened and ground studs. By removing one screw shaft and gear, assembly can be removed from the frame. Shafts can be adjusted and locked in a position to eliminate end play. For replacement, both shaft and gear assembly can be replaced eliminating rebushing frames. All lubrication is done on the gear side with the exception of the intermittent movement. The old reliable oil can is used for lubricating necessary parts when and where it is needed. As most necessary equipment and sound reproducers require manual oiling, this is not an additional burden to the projectionist. All oil cups are painted red which makes overlooking improbable.

The intermittent movement (Figure 6) is the star-and-cam, double-bearing type. End play in the cam shaft can be easily adjusted. The pad roller arm is a part of the intermittent movement. Two pad rollers are used which allow the film to move over the sprocket without friction. A fixed film snubber takes the slap out of the intermittent loop and steadies the picture without friction on the film itself. Movement can be removed from the frame in a few minutes.

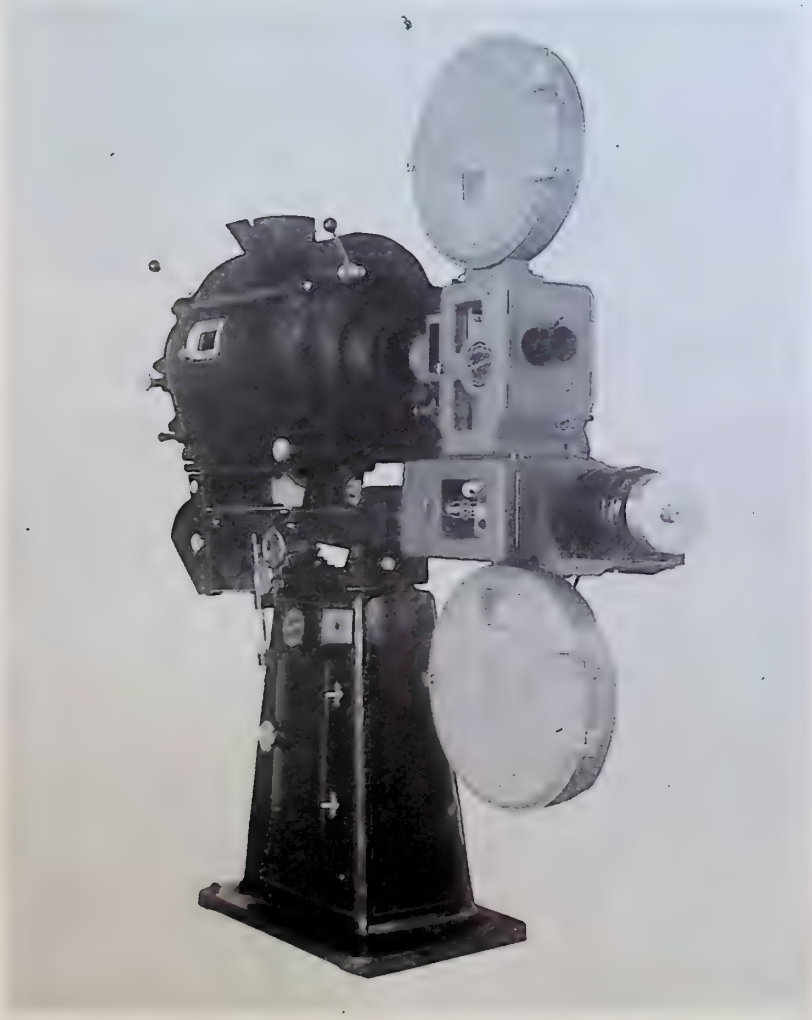
Some of the main features of the Superior Model A are that it is a simple, rugged projector, a clumination of the most modern scientific engineering giving the maximum performance with a minimum of service. Exceptionally simple to operate with minimum of wear and maintenance.

This smartly designed projector can be disassembled and assembled with an ordinary screw driver in less than 50 percent of the time required for any other professional theatre type projector.

Mechanism fits all standard bases, magazines, sound heads and drives.

During the war Blue Seal produced intricate sound equipment for the Office of Strategic Services, the Marine Corps, Army Air Forces and other essential branches.

FIGURE 1—The Model A Superior 35-mm. projector retains the qualities of the earlier Model X and Model U. The design of the new equipment embodies all the advanced scientific and technical information and developmnts in present-day projection. Here is pictured a habit shot of the projector in association with a Blue Seal sound system, Superior pedestals and a Strong projection arc lamp.



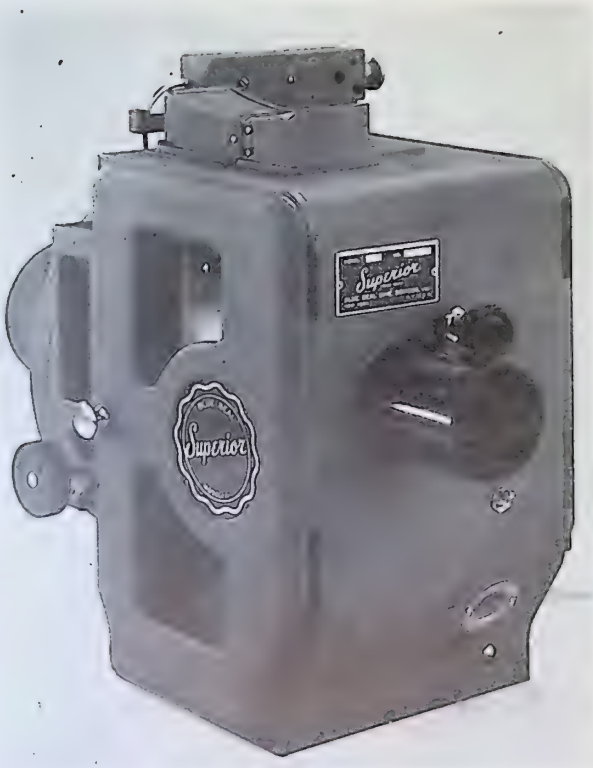
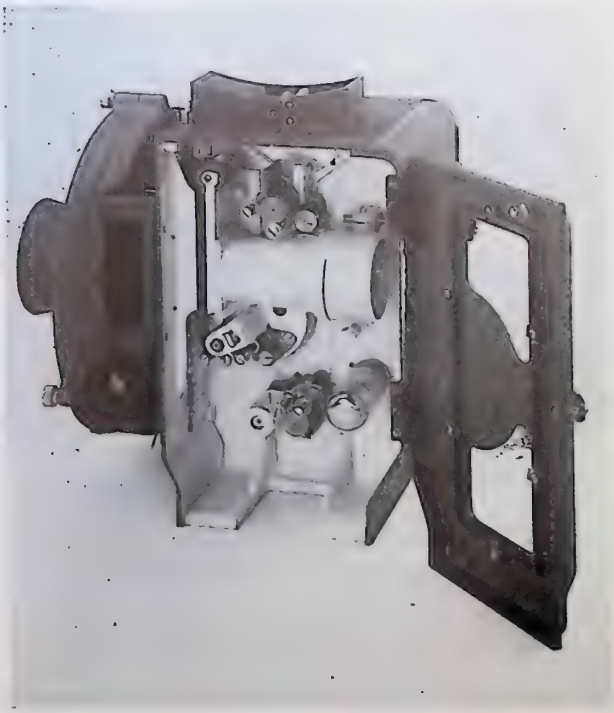


FIGURE 2—The exterior appearance of the Model A Superior projector head is attractive, and is finished in gray morocco, which matches other components necessary to assemble a complete projector. The mechanism is designed to be simple in operation, with a minimum of wear and maintenance.

FIGURE 3—The film side is roomy, easy to clean and easy to service. The micrometer focusing lens mount accommodates the new high-speed coated lenses without the use of adaptors. The aperture plate is of one-piece, hardened and ground construction. There are two sets of film shows.



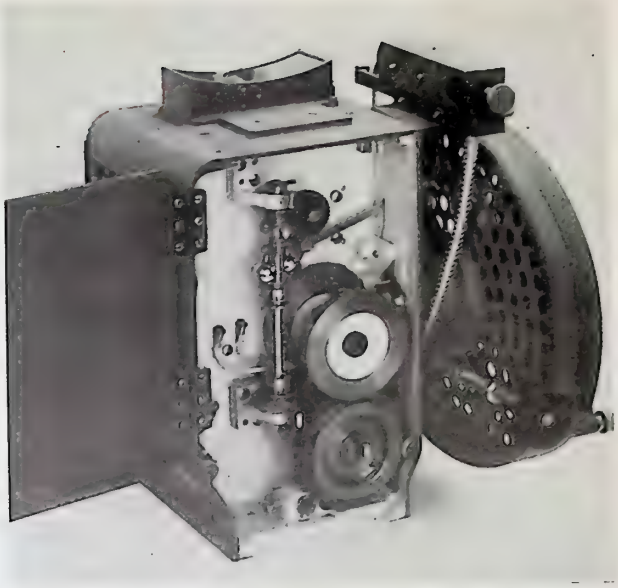
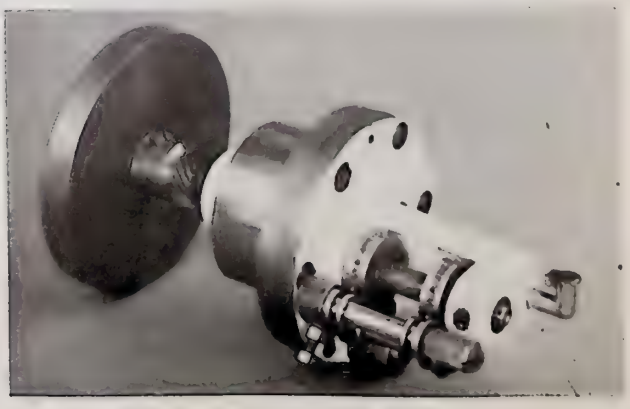


FIGURE 4—The drive side is of simple design, eliminating unnecessary gearing. The vertical shaft carries the ball-type governor that controls the fire shutter. The rear shutter is driven directly from the cam shaft. The projector head fits properly with all standard projection equipment.



FIGURE 5—Intermediate and main-drive gears revolve on fixed hardened and ground studs. By removing one screw, shaft and gear assembly can be removed from the frame. Shafts can be adjusted and locked in position to eliminate end play. Both shaft and gear assembly can be easily replaced.

FIGURE 6—The intermittent movement is the star-and-cam, double-bearing type. End play in the cam shaft can be easily adjusted. The pad roller arm is a part of the intermittent movement. Two pad rollers are used which allow the film to move over the sprocket with minimum friction.



The Gaumont-Kalee 21 Projection and Sound

Whole New Line of British Booth Equipment Is Offered for American Theatres, Studios

FOREWORD

Too frequently, albeit often without realizing it, Americans assume the idea that only that which is produced in the United States is of especial significance and of particular value. Yet that idea stems not infrequently from ignorance rather than from blind, unreasoning bias, as is indicated by the reception given many offerings from the various J Arthur Rank picture-producing units.

A similar eye-opening came to the equipment business last October when, at the 62nd semi-annual convention of the Society of Motion Picture Engineers, the Gaumont-Kalee 21 projection and sound equipment was unveiled before American theatre and technical men.

So perhaps it was that what might have been "one of these things" turned out to be an event of singular importance, for interest ran at an intensity not general at such events, so completely unusual was this new equipment regarded.

Although the time was short, too short for complete editorial coverage, authoritative descriptive material was obtained through the cooperation and courtesy of Edward L. Harris, general manager of Gaumont-Kalee, Ltd., in Toronto, and of Charles H. Bell, general manager of G. B.-Kalee, Ltd., in London. It is from this graciously provided material (much of it esoteric) that the following summary descriptions of various items of the new equipment have been prepared.

PROJECTION . . .

The world's newest projection and sound equipment—the Gaumont-Kalee 21—is not only modern in every sense of the word, but revolutionary in thought and principle, and boldly conceived in design, style, and coloring. This complete sound and picture projector is a new conception in motion-picture equipment which may set the standard.

Totally enclosed, the Gaumont-Kalee 21 presents a graceful, streamlined appearance, in striking contrast to any other available equipment, providing complete silence in operation with utmost fire protection, and ensuring a greater cleanliness throughout.

The new equipment is a high example of what can be achieved by the close collaboration between experts in the two fields of projection, sound and picture. Gaumont and Kalee scientists and designers have joined forces to produce an equipment which functions as a complete unity.

The improvements incorporated in the new mechanical and optical design result in the highest attainable performance and faithfulness in picture and sound presentation, as well as that of reliability, efficiency, and simplicity in operation.

To see the new Gaumont-Kalee 21 in action is to acclaim it a veritable masterpiece of British motion-picture development, precision engineering, and scientific skill.

The Projector

The Gaumont-Kalee 21 is an advance in design and performance over all previous Kalee projectors, with the following items set forth as the special features of the new equipment:

The projector is designed to use the new wide-aperture Kalee coated lens and the large-diameter arc-lamp mittor.

Two rear shutters, to give the utmost light efficiency, are provided.

The mechanism is totally enclosed, for cleanliness and silence in operation, with lamps being provided for internal illumination.

All mechanical parts run in an oil bath. A mechanical pump, distributor, and filter ensure a continuous distribution of clean oil.

The intermittent movement is quickly detachable.

Pressure rollers are self-sustained in an open position. The parallel gate is detachable.

An electrically operated changeover is incorporated with the fire shutter, and both arranged for remote control. Provision has also been made for a specially designed Pyrene fire equipment arranged as an integral part of the projector.

The magazines will accommodate 2,000-foot reels which rotate on 3/8- or 5/15-inch spindles incorporated as part of the projector design.

All parts of the equipment are readily accessible for servicing, and all wiring for both projector and arc lamp is totally enclosed.

The equipment is finished in an attractive, cellulosed color combination of beige, maroon, and silver, with the exposed parts chromium plated.

The Stand

The base portion of the stand has bolted to it the central column of pillar, and bolted to the top of the column is the bearing piece for the trunnion pin about which the rest of the assembly pivots.

The base portion of the stand and the central column are of cast iron. The rest of the stand, including the magazines and magazine doors, are of cast aluminum.

Three different lengths of center columns are made, to give three different stand heights. On level rake, the height from floor level to lens center, and consequently the height from the floor to center of porthole, is 51¼ inches with the high stand, 48¼ inches with the medium stand, and 45¼ inches with the low stand.

The maximum downward rake possible is 30 degrees with the tall stand, 25 degrees with the medium stand, and 20 degrees with the low stand. An upward rake of 5 degrees is possible with all stand heights.

The Arc Lamp

The arc lamp incorporates a 16-inch diameter mirror, giving a greater light output than has heretofore been attained, and requiring less critical focusing.

Any carbon current combination, up to 80 amperes, can be accommodated.

The streamlined lamphouse has an enclosed dowser. The flush doors, when opened, expose the full length of the lamphouse.

The working parts of the lamp are readily withdrawable as complete units for cleaning and adjustment.

Conveniently grouped at the back of the lamphouse, the controls include twin knobs for adjustment of the carbon alignment, a switch for the feed motor, potentiometer control of rate of speed with a tachometer showing the actual feed, micrometer adjustment for positive-negative feed ratio, and a push-button striker for the arc.

Interior illumination is provided, and is controlled by a door-operated switch.

. . . AND SOUND

A complete single-channel sound system comprises two soundheads, one voltage amplifier with volume-control panel, and one rack with power amplifier, metal panel, power supply panel, dividing network, and two exciter supply panels.

Soundhead

The soundhead has been designed not only to satisfy the most rigorous cinema requirements, but to meet the even more exacting needs of film studio re-recording.

The soundhead incorporates features such as the fluid flywheel and enlarged image optical system, but is a completely new design. Externally it is of clean and attractive line, closed on the operating side by two doors with transparent windows.

The purpose animating the design was to secure a high-grade performance which should remain utterly stable over long periods and long life due to robust construction of all parts subject to wear. From the maintenance engineers' point of view the soundhead is one which can be kept in service for 20 years without going back to the factory, and without the necessity in that period of using a file, reamer, hammer, or drift.

There are three rotating shafts in the soundhead, the one carrying the fluid flywheel and the scanning drum, and two which carry a film sprocket at one end and a gear wheel on the other. These three shafts are not carried in bearings located in the soundhead casting, but the shaft with its bearings, is contained in a long, flanged housing of

circular cross section which in turn fits a machine bore in the soundhead casting. The flywheel shaft runs on precision ball bearings, as it is essential that it should impose the minimum load on the film. The two sprocket shafts run on oilite bearings as they are driven by the motor.

To cope with different voltages and periodicities, it is necessary to use a number of different types of motor. For the normal British supply of 190 to 260 volts, 50 cycles, a ¼-hp. capacitator start motor is used, but this is supplied in three different models wound to suit respectively voltages of 190 to 210, 215 to 235, and 235 to 260. Externally and in all dimensions, these three motors are identical. The motor is mounted in front of the soundhead with its shaft horizontal and parallel with the sprocket shafts of the soundhead. The drive from motor to soundhead is by twin, short, endless, canvas-and-rubber V-belts. The ratio of belt pulleys on motor and soundhead is such that the motor speed of 1,470 r.p.m. is reduced to a speed at the soundhead of 990 r.p.m.

The motor itself is resiliently mounted, and is held to the stand by four set screws passing through elongated holes in the motor base. The set screws enter tapped holes in the stand. The motor and the belt drive are protected by a quickly detachable, louvered cover, through which an inching handle projects on the operating side.

For 60-cycle supplies, the same motor is used, with an appropriate increase in the reduction ratio of the belt drive. For 40-cycle supplies, a special 40-cycle motor is used, and the reduction ratio on the belt is decreased. For 25 cycles, a special 25-cycle motor is used, which, having two field poles, rotates at approximately the same speed as the standard 50-cycle motor. For 30 cycles, the 25-cycle motor is used, with an appropriate adjustment to the belt drive ratio.

For special studio requirements, a 3-phase synchronous or an interlock motor is used, and as truly synchronous speed must be maintained on the film sprockets, gear drive takes the place of belt drive. Where, as in theatre practice, only a close approximation to talkie speed is required, belt drive has everything to recommend it. It simplifies the layout, is silent and long-lived.

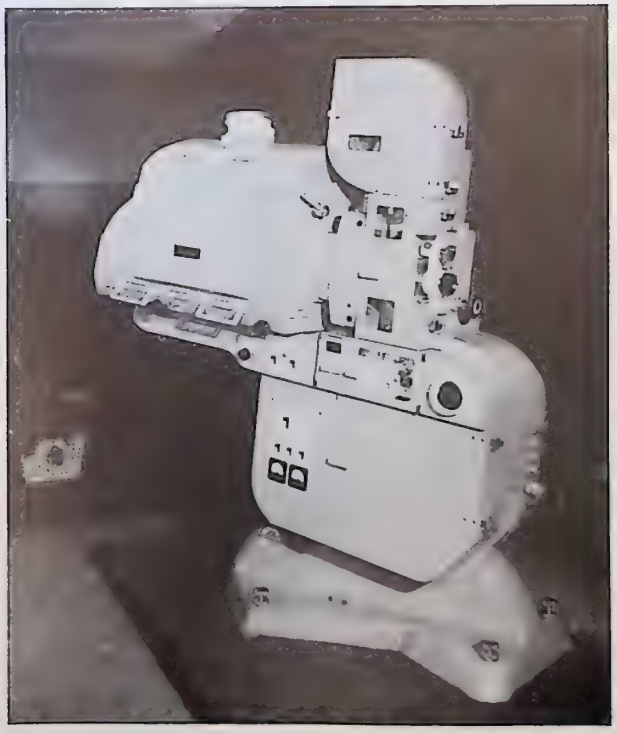
The driving pulley of the soundhead rotates with the main driving pinion, to which it is held by three screws on a heavy stationary layshaft, hardened and ground. This layshaft is very securely held, for an inch and a half of its length, in a machined bore in the soundhead casting. The layshaft is inserted from the non-operating side into the machined bore, its accurate location being determined by a shoulder on the shaft, and held in position by a nut on the operating side of the soundhead, into which the threaded end of the shaft just protrudes. The pulley and pinion are retained on the layshaft by a washer and large hexagonal retaining screw. The retaining screw is bored and tapped for a Rotherham-type oiler. The pulley and pinion are oilite bushed. The Rotherham oiler communicates with an annular groove in the shaft, from which the oil reaches the bushes. A guiding idle sprocket for the chaine drive to the bottom take-up is also carried on the layshaft.

In addition to this layshaft, there are only two other shafts to carry the rest of the gearing, including the gear which drives the projector and the chain-wheel which drives the bottom take-up. These remaining two are the sprocket shafts already referred to, carried with their bearings in detachable housings. The shafts themselves are hardened and ground. The shaft is on bearings with a center annulus which acts as an oil reservoir. The housing has a large D-shaped flange on the operating side, and this flange carries the lay on roller, spindle and bracket, and the film stripper. The complete housing is inserted into its bore from the operating side of the soundhead, and secured by three screws which pass through the flange into tapped holes in the soundhead. The spacing of the three screws make it impossible to fix the housing in anything but the right position, and the location of lay on roller and stripper on the flange ensure permanent alignment of these components with the sprocket.

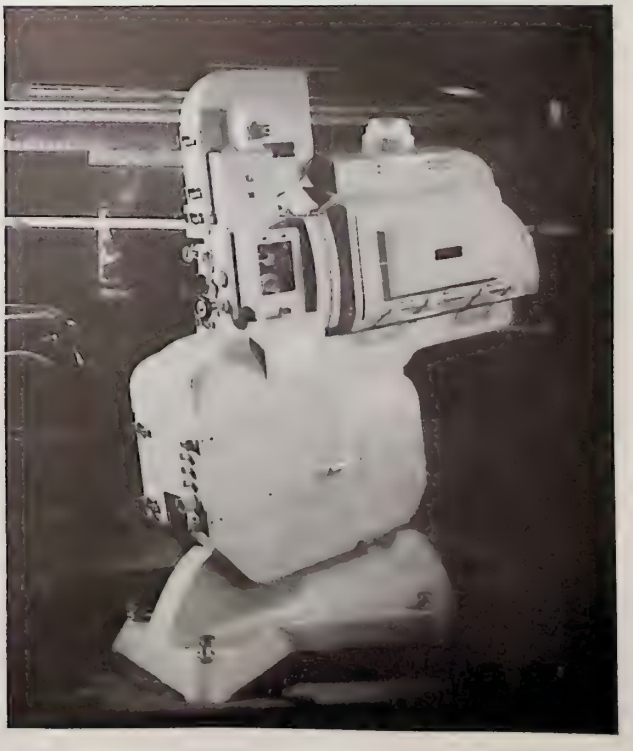
These two assembles of shaft, bearings, and flanged housing carrying lay on roller and stripper are identical and interchangeable, although the stripper, according to whether the assembly is used in the upper or lower position, adopts one of two different positions. Provision for these two positions is very neatly provided for by a small key, integral with the stripper, which engages with one of the two key ways. In either position the stripper is positively held at the correct angle.

The two film sprockets are not the

THE GAUMONT-KALEE 21 PROJECTOR, seen from the operating side, is totally enclosed. The streamlined appearance and the flush, tight-fitting doors to the arc lamp, projector mechanism, soundhead, and magazines are noted. Arc controls are on a panel at the rear of the lamphouse.



ON THE NON-OPERATING SIDE, the gas cylinder (seen beside the upper magazine) for fire-fighting can be noted, as well as the large view window showing the lubrication system. The color scheme is in middle-stone picked out with white lines, maroon, and with the bright parts chromium-plated.



same in diameter on the film face. The upper is acting as a feed sprocket. The lower is acting as a hold-back sprocket. Except for a difference in diameter, the sprockets are similar, and are held on their shafts by an end screw and key washer.

The upper sprocket shaft carries, on the non-operating side, a large fiber gear, the driving chainwheel for the bottom take-up, and a small fiber gear. These two gears and the chainwheel are screwed together and rotate as one, and are keyed to the slotted end of the shaft by a key washer integral with the large gear wheel. The whole assmbly is held on the shaft by an end screw.

The main driving pinion on the lay-shaft engages with the large fiber gear on the upper sprocket shaft, the gear reduction being such that the 990 r.p.m. of the driving pinion is reduced to the correct speed of 360 r.p.m. on the sprocket shaft.

The large gear wheel is of such a diameter that its upper part is just proud of the top face of the soundhead. The projector is driven from this gear wheel.

The lower sprocket shaft carries on its non-operating side only a small steel gear and an idle guide sprocket for the chain drive to the bottom take-up. The gear is driven by the small fiber gear on the upper sprocket shaft, the ratio being, of course 1:1. The gear on the lower shaft is keyed to the slotted spindle by a key washer integral with the gear wheel, and retained by an end screw.

All the gears in the train described are robust and should give many years' service.

The gears and shafts already decribed are mounted on the soundhead casting proper. The scanning drum shaft, together with the optical system, photo cell, and exciter lamp, which together comprise the scanning unit assembly, are carried on a resiliently mounted plate attached to the soundhead casting.

The housing that carries the scanning drum shaft and fluid flywheel is offered up to its bore from the non-operating side. It is held in position by three screws passing through the flange of the housing into tapped holes in the plate.

The fluid flywheel is retained on the shaft by a hexagonal end nut and a shouldered washer. There is also another washer on the other side of the flywheel.

The lay on roller, which holds the film in contact with the drum, also runs on ball bearings. An enclosed spring-loaded plunger, with non-adjustable tension, applied a predetermined thrust on the lay on roller bracket. An engraved disc permits of tracking the lay on roller in respect to the scanning drum so as to correct for possible displacement of the sound track.

The optical system of the soundhead is one of its most interesting features. The exciter lamp is mounted in a compartment on the extreme left of the soundhead. Immediately in front of the lamp is a large condenser which projects the light horizontally forward to a prism mounted partly within the scanning drum. The prism reverses the light path and directs it back through the sound track, through the objective lens and on to the window carrying the mechanical slit. The window is in a housing containing a prism, which directs the received light vertically downward on to the cathode of the photo cell. The optical magnification is six times, which means that an enlarged image, six times that of the actual sound track, is impressed on the window. With the film stationary, it is immediately possible to check whether the focus is approximately correct, and with the film running, it is immediately evident if either sprocket holes or the edge of the picture is being projected onto the slit. The window has fixed masks to accept the internationally accepted scanned width of sound track of 0.084 inch. The adjustable tracking of the lay on roller centers the scanned sound track on the window. The slit is correctly adjusted for azimuth (horizontally) at the works and locked with an Allen screw.

A detail refinement in connection with azimuth adjustment of the soundhead deserves mention. The window upon which the mechanical slit is engraved is locked by an Allen screw immediately below the window. Just in front of the large condenser lens is a screw head, which is, in fact, the end of a fine worm which meshes with a worm wheel on the mount of the window. If the Allen screw be loosened, the window carrying the slit can be rotated by applying a small screw driver to the screw head.

As the slit is correctly set at the works, the adjustment provided is not intended to be used by operators or during ordinary service work. Once adjusted and locked, it cannot vary, but a supervising engineer may need to satisfy himself that the setting is optimum. The only satisfactory way to do this is to employ a long length of focusing film, or an endless loop, and with a voltmeter, a power level indicator, coupled to the output terminals of the power amplifier, alter the azimuth adjustment while the film is running until a maximum meter reading is obtained.

Focusing of the soundhead objective lens is also best done by the same method, focusing film and meter, as recommended for azimuth adjustment, although it can also be done by inspection of the image on the window, or by the "blink" method. If the inspection or the blink method be used, it is essential that a sufficient length of focusing film be employed to ensure that it lies on the reproducing drum in exactly the same way as would a whole reel in normal running. This means that the focusing film should be laced through from the bottom sprocket of projector to fire trap of lower spool box, allowing the usual size of loops, and the film should be induced to adopt the normal running position past the scanning point by turning the inching handle.

The optical system is of such a design that even with maximum light on the window, filament structure is not projected. The correct adjustment of exciter lamp, condenser lens, and supplementary lens is that which gives maximum light on the window, and consequently greatest output from the photo cell. The exciter lamp should be set so that the horizontal bar of light from the condenser falls squarely across the entry side of the prism. The condenser should be adjusted so that the maximum intensity of light is projected on to the window, taking care to preserve horizontality of the condenser mask. Any deviation from the horizontal of the mask will immediately be apparent on the window. Optimum position for the condenser lens will be found to be that when the front edge of its barrel is level with the front edge of the mount. The supplementary lens, on the exit side of the prism, will usually be found to give greatest light when screwed right home. It is locked by an Allen key. Once the condenser and supplementary lens have been adjusted, there is no need to alter them. They do not require re-adjustment when an exciter lamp is changed.

When an exciter lamp is changed, it is only necessary to check that the bar of light is across the center of the prism, and that in consequence the light projected onto the bridge is evenly disposed above and below the slit. The height adjusting screw on the lamp holder will immediately correct for any difference between one lamp and another.

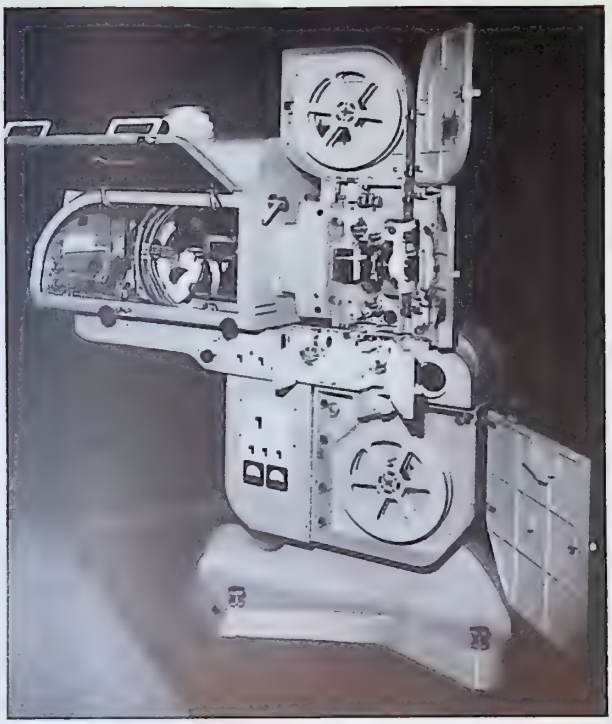
The photo cell—a gas type with caesium cathode, with standard (British) four-pin base—is carried horizontally in a cast aluminum box below the condenser lens. Access is obtained by removing the two cheese-headed screws in the front cover. Access to the pins of the cell holder is obtained by removing the screws which hold the dished cover on the front of the cell box.

Various types of slits can be used with the soundhead, depending upon the purpose for which the head is used. For re-recording a very fine slit is used so that a straight line frequency response may be obtained from the cell. For all normal reproduction purposes a comparatively coarse slit is used, because the over-all frequency response curve recommended by the Academy of Motion Picture Arts and Sciences entails serious curtailment above 2,000 cycles. The standard reproducing slit is 0.009 inch high, and taking into account the six times magnification of the optical system corresponds to a slit dimension of 0.0015 inch. This dimension naturally results in a considerably increased amount of light being passed to the photo cell, with a gain in cell output and an increased signal voltage on the grid of the first tube. Its effect on the frequency response curve is progressively to attenuate the response curve above 2,000 cycles, giving a maximum of —12 db. at 8,000 cycles.

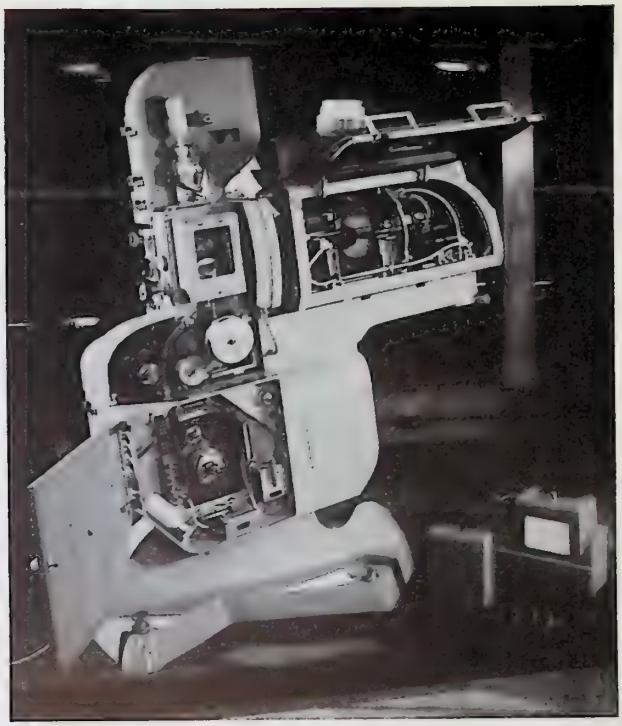
The photo cells are coupled by low capacity coaxial cables, not directly to the grid of the first tube, but to the outside contacts of the changeover switch on the control panel. From the moving arm of the switch, the signal is conveyed to the input tube of the voltage amplifier. The switch is noiseless in operation, and will remain so because it handles no direct current. Isolating condensers prevent the arrival at the switch of d.c. from the cells, and another condenser prevents microscopic grid currents arriving from the input tube. Even though the switch were to develop high contact resistance, it would cause neither loss of sound nor contact noise.

The efficiency of the optical system, due to the use of optical components of large effective aperture, and to the coating of all the surfaces of condensers, lenses, and prisms, is high.

The exciter lamp is a normal 8-volt,



THE OPERATING SIDE, with all doors open, emphasizes the extreme accessibility to all working parts for service, maintenance and operation, and cleaning. The interior of the soundhead is finished in hard, white porcelain enamel. The magazines and magazine doors are of cast aluminum.



THE NON-OPERATING SIDE is seen with the doors open to arc lamp. In the pedestal are seen the drive and automatic cut-off for the motor in the event of fire, and also the position of the spare gas cylinder. The covers of the motor housing are removed. Note the fire-fighting equipment.

4-ampere type, and the photo cell is a normal gas type on a standard British 4-pin base.

The complete soundhead is immune to rust. The soundhead and the plate upon which is assembled the scanning unit are of cast aluminum of heavy section. The three bearing housings are die castings. The exciter lamp mount, the prism mounts, and the condenser mount are all die castings, as are the cell housing, slit unit plate, brackets for lay on roller and pad rollers, and the strippers. The lay on roller is nitrided steel, and small rollers and retaining screws are either of stainless steel or chromium-plated steel.

Voltage Amplifier

All units of the Gaumont-Kalee 21 amplifier chain are built on 20-inch wide cadmium-plated flat panels for mounting in the vertical plane. The plating renders them rust-proof and ensures in perpetuity perfect metallic contact with the panel of all components mounted thereon.

The voltage amplifier is assembled on a panel 20 by 9 inches. All valves and components are on the front face, with connecting terminals projecting through to the back, on which side, in one plane, is all the wiring. Every component is rated for continuous tropical use.

The voltage amplifier may be mounted with the control panel at the bottom, or the whole frame may be inverted so that the control panel is at the top. Local conditions will dictate which way round is most convenient, although control panel at top will probably be found to be the most generally useful. There is provision for bringing conduit into the frame at both top and bottom.

The cabinet rack carries the 80-terminal panel at the top, and all conduit goes via the 63 trunking box to the top of the rack. The conduits act as a rigid brace for the rack.

Schematically, and in total number of components for a complete amplifier, it is extremely simple, comprising nothing more than three valves, resistance capacity coupled. There is no input or output transformer, and apart from the three valves and valve holders, there are only the requisite coupling and decoupling resistances and condensers. H.T. and heater supplies are obtained from the main rack.

The input valve is a pentode. The other two valves are triodes. This disc input is taken to the second stage. The tone control unit is electrically in the grid circuit of the third stage. Degenerative feedback is applied to the last two stages.

The tone control gives independent control of bass and treble response, and is a self-contained unit which is readily detachable from the panel. Of deliberate design, access to this unit can only be obtained from the back of the panel. From the front of the panel all that is visible of it is its metal shroud.

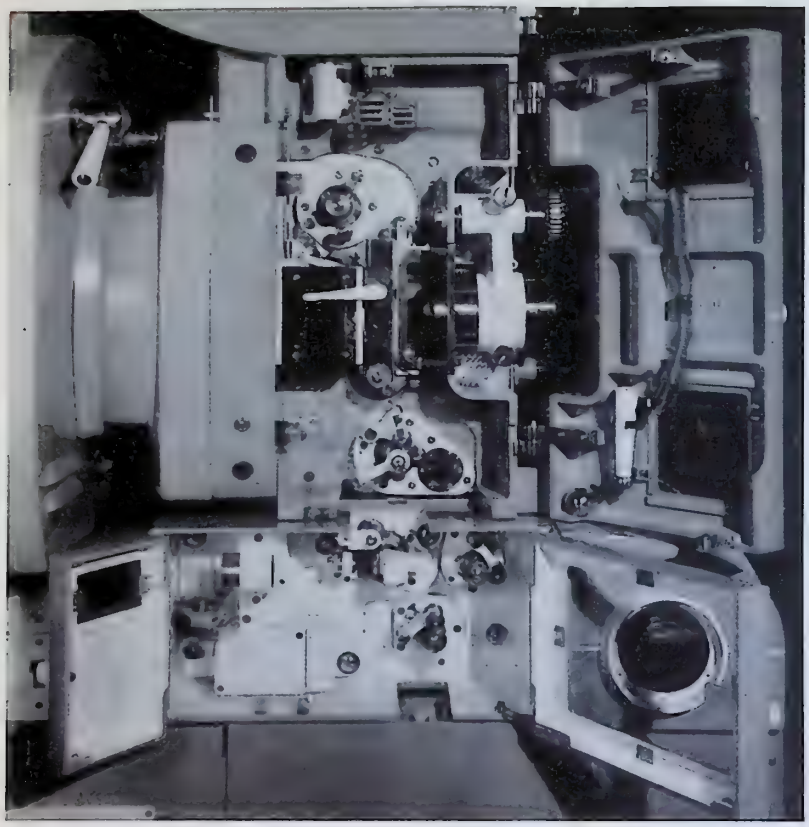
The amplifier is housed in a wall mounting case which is carried on a hinged frame. Access to the valves is obtained by removing the detachable cover. Access to the back of the panel is instantaneous by undoing a catch and swinging the panel door open on its hinges.

The opening portion is hinged to a rigid frame fixed solidly to the wall, and this fixed frame is of sufficient length to accommodate, under a detachable cover, a small control panel which carries equipment closely associated with the amplifier.

The amplifier is used in two different ways. With a single channel amplifier system, one only is mounted between the projectors. With a duplicated amplifier channel, an amplifier is mounted on the wall adjacent to each of the two, or three, soundheads.

Use with Single Channel Amplifier.—When only one 52 amplifier is used, the components on the small control panel are the main fader (volume control), the changeover switch, and the film, disc, microphone switch. The photo cells are linked to this control unit by coaxial cables, and the changeover switch connects either the left or right hand cell through to the grid of the input valve of the amplifier. The changeover is noiseless and the method chosen permits any or all adjustments to be made on the soundhead not in use without interference with the program. The main fader is 22-stud, click-action type, completely enclosed, with a total resistance of 40,000 ohms. The output of the 52 amplifier goes by way of this fader and from the fader is conveyed on a coaxial cable, enclosed in a conduit, of course, to the input of the power amplifier. There is no transformer at either end of this line.

There is provision for mechanically coupling the control unit to a remote control, so that both changeover and variation in volume level can be effected from the operating position of either machine.



CLOSE-UP VIEW of the projector mechanism and the sound head. Note the quickly detachable, parallel action gate, the large diameter lens, and the built-in fire-extinguishing equipment with leaf-type fire trap. The new equipment is an example of what was achieved by the concerted cooperation between Gaumont and Kalee scientists and engineers in the two fields of projection, sound and picture.

H.T. and heater supplies are obtained from the main power supply panel on the rack. A meter panel also on the rack, measures, on one position of its switch, the total anode current of the amplifier.

Use with Duplicated Amplifier Channel.—When two or three amplifiers are used, each of the small control panels carries an "emergency" switch, a film, disc, microphone switch, and a transformer stepping down to a 500-ohm line. The chance of an amplifier failing is admittedly remote, but in the event that this unlikely happening the emergency switch cuts out the defective amplifier and connects the photo cell output direct to the other, or one of the other, amplifiers. In this emergency condition, changeover is still not done on exciter lamps, but on the emergency switch of the amplifier. Any necessary repair work can be done at leiseure, without stoppage of or interference with the program.

The 500-ohm output lines are connected to a separate main volume control unit which also carries the changeover switch. Remote control units enable changeover or variation in volume level to be effected from two or three operating positions.

H.T. and heater supplies, when two or more amplifiers are used, are obtained from a separate supply unit, mounted on the rack. There is provision for metering the anode current of each amplifier. In emergency, H.T. and heater supplies can be obtained from one of the main power supply units.

Power Amplifier

The power amplifier is mounted on a standard cadmium-plated panel 20 inches wide which is carried on the rack in the vertical plane. Its height is 9 inches. All major items, valves, condensers, transformer are mounted on the front face. All the wiring is at the back of the panel. Every component is visible and identifiable, and can be detached or replaced without disturbing any other component. Every inch of the wiring can be inspected, and every wire can be traced from origin to destination. All the components are rated for continuous tropical use.

The amplifier comprises three stages, the power output of 30 watts being obtained from four tetrodes in parallel push-pull. Degenerative feed back is applied over the complete amplifier, from output to input.

The first stage is a pentode. This is resistance capacity coupled to the second stage, a triode, working as a phase inverter. This phase inverter valve has fixed value of anode and cathode resistance, the circuit employed being one that eliminates the undesirable feature of manual balancing. The inverter stage is in turn resistance capacity coupled to the generous output stage. Thirty speech watts output is obtained from valves which are run in comparison with maker's permissible rating. On full output, there is less than 1½ percent of total harmonic distortion.

Bias to all stages is obtained in the most straightforward and trouble-free way, by the voltage drop across resistances in cathode circuits of the individual valves. Except for the output transformer, there is no iron-cored component in the panel.

H.T. and heater current are obtained from a separate panel, the power supply unit.

The power amplifier and power supply unit have already been described. A meter panel is mounted between them, and on the sevral positions of its selector switch gives a reading for total plate consumption of the voltage amplifier, of each of the first two stages of the power amplifier, of the four power output tubes in pairs, and of the value of H.T. available. The meter, in each of the switch positions, should read in the region of 0.4, but by reason of the number of resistances, all of which must have a small tolerance, it is desirable with each installation to establish a normal reading for subsequent reference.

The power amplifier is designed to feed into an optimum load of 10 to 12 ohms. The impedance of the power stage, looking into it from the terminals of the output transformer, is 5 ohms.

Use in Single Channel Equipments.—When an amplifier forms part of a single amplifier channel, it is mounted in an imposing cabinet-type rack which also houses a power supply panel, a meter panel, two exciter rectifier panels, a dividing network, and a connection panel. Access is provided to both sides of all the panels. It is recommended, wherever the size of the operating box permits, that the rack should be so placed as to leave behind it a clearance of 2 feet 6 inches. When necessary, this clearance may be reduced to a minimum of 1 foot.

So far as running adjustments or the replacement of valves is concerned, it is only necessary to have access to the front of the panels, and this is given by a full-length door on the front of the rack. The backs of the panels are reached by detaching the rear covers of the rack.

Use in Duplicated Channel Equipments.—A dual channel is housed in two cabinet-type racks. Normally the two racks are placed close together to facilitate the wiring, but if the shape of the operating enclosure dictates such a course, they may be separated by any desired distance.

Each rack contains a complete amplifier channel, comprising an input panel carrying the necessary transformer to terminate the low impedance input line, a power amplifier, a meter panel, and a power supply panel. On one rack is a control panel which selects the channel to be used. The racks are completed by other panels, exciter rectifier, dividing network, and voltage amplifier, necessary to the function of a complete equipment.

Power Supply Panels

So as to cope with all main frequencies between 25 and 60 cycles, two different types of power supply unit are produced. Were it not for the fact that

the cost of the 25-cycle unit is considerably greater than that of the 50-cycle unit, there would be no point in making two types, because the 25-cycle type is entirely suitable for use on any frequency from 25 to 60 cycles. In fact, in certain overseas areas, where both 25- and 50- or 25- and 60-cycle mains are encountered, it is the company's recommendation that the 25-cycle unit should be installed in all cases so as to reduce the number of different components it is advisable to carry as depot spares.

The two units are basically similar and assemblded on the same size cadmium-plated panel, 20 inches wide by 12 inches high, for mounting on the rack in the vertical plane. All components are mounted on the front face of the panel, with all wiring in one plane on the back face. Either unit, under the most severe tropical conditions, has a safe output for continuous service of 250 milliamperes at 380 volts. All condensers used are of the paper dielectric type with a working voltage of 750 at a temperature of 140 degrees Fahrenheit (60 degrees Centigrade).

Two hard thermionic rectifiers are employed, but the valve holders are so wired that, when a valve is inserted, its anodes are strapped together. Each valve, therefore, behaves as a half-wave rectifier, the two together working as a full-wave rectifier.

One power supply panel is intended solely for operation from 50- or 60-cycle supplies. The three transformers, high tension, rectifier filaments, and 6.3-volt supply for valve heaters, have untapped 230-volt primary windings. Irrespective of the mains voltage, which may be of any value between 95 and 130 volts, or between 190 and 260 volts, a 230-volt supply is available by adjustment of the transformer contained in the separate switch fuse distribution unit.

Very generous smoothing is provided by a two-section choke input filter circuit. The choke input circuit gives much better regulation of the smoothed d.c. output, against varying load, than could possibly be obtained with a condenser input circuit. Two heavy-duty 7-henry chokes are employed, and each choke is followed by a capacity of 16 microfarads, formed of two 8-microfarad blocks in parallel.

There are three high-tension positive output terminals, of which two feed the power amplifier, and the other feeds the voltage amplifier.

The other power supply panel is primarily intended for operation from 25-cycle supplies, but can be employed universally for 25-, 30-, 40-, 50-, or 60-cycle supplies. Its single transformer has three secondaries for high tension, rectifier filaments, and 6.3-volt supply for valve heaters. The primary is in two sections, which are put in parallel for connection to a 115-volt supply of any frequency from 25 to 60 cycles. The sections are put in series for connection to a 230-volt supply of any frequency from 25 to 100 cycles. The transformer in the switch fuse distribution unit is adjusted to give either 115 or 230 volts, irrespective of the actual mains voltage.

The same degree of smoothing is provided as on the 54, but because this power supply panel has to contend with frequencies down to 25 cycles, the choke input filter circuit has three sections. The additional section comprises a 30-henry choke and an 8-microfarad condenser. This extra smoothing is effective on the output terminals.

Duosonic Speaker Assembly

The Duosonic speaker assembly renders the utmost fidelity in reproduction and, with its asscciated frequency-dividing network, gives a conversion efficiency of the order of 50 percent, an extraordinarily high figure. The frequency response range exceeds that of the medium film or disc, upon which the sound is recorded, and the whole assembly is, therefore, well suited to the faithful rendering of the output of the system as a whole.

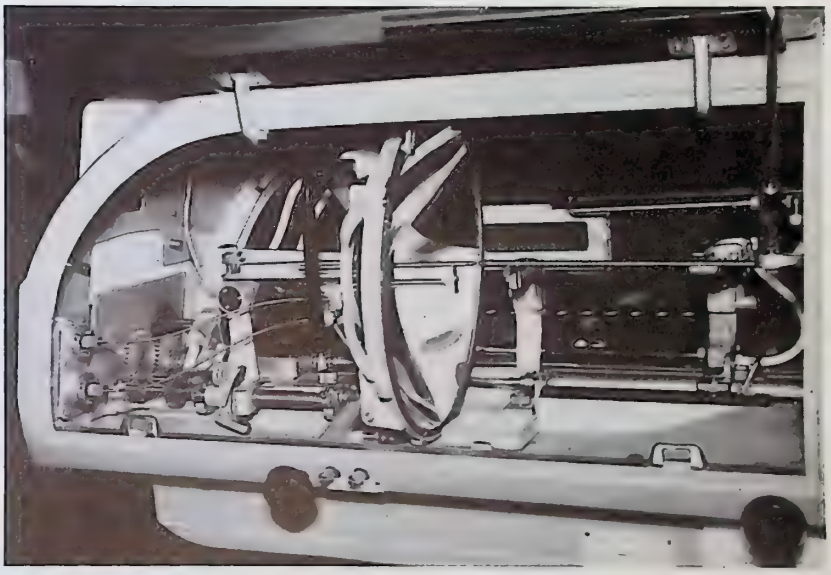
Various models of the Duosonic speaker assembly are available in combinations of treble and bass horns, adapted to the size of the theatre auditorium.

The bass horn is constructed of fireproofed timber, complete with baffle surround.

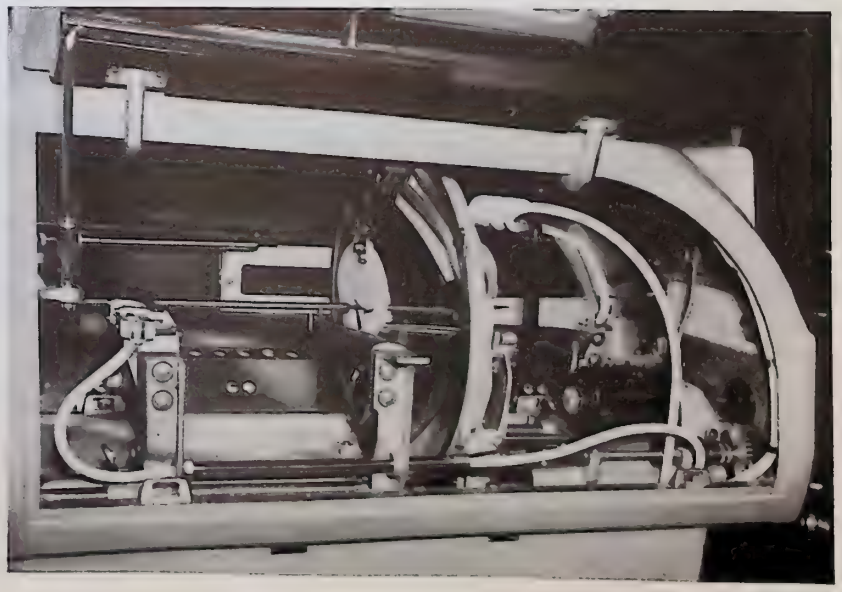
Monitors

Two monitor speakers may be provided, each with its own on-off switch. The volume of sound output from each is adjusted at the time of installation to be representative of the sound volume in the auditorium. This unique feature secures true monitoring, as distinct from a mere aural indication that the system is in operation.

In very large installations, a separate amplifier of 10 watts undistorted output is provided for monitoring, leaving the main amplifier free to serve the auditorium.



FULL LENGTH ARC LAMP DOOR, open on the operating side (above), reveals the 16-inch reflector, quick carbon holders, magnetic flame control. Controls are grouped on a rear panel.



ON THE NON-OPERATING SIDE (below) can be seen how the mechanism is removed as a single unit. The layout is simple and parts accessible. Interior lighting is controlled by a door switch.

The New Ashcraft C-70 Projection Arc Lamp

New Major Features Are Said to Constitute New Advance in Design of Carbon Arc Lamps

Three years in the planning and actual design stage, and marking thirty years' experience in the building of carbon-arc lamps, the new Ashcraft Suprex C-70 projection lamp embodies several major features and numerous others which constitute a radical departure from conventional design and signalize a distinct advance in the art.

Among the features of the new C-70 lamp are the following:

Wide range—40 to 65 amperes current capacity.

Unit construction—a compact, removable mechanical element which simplifies operation and servicing and assures long life.

Exterior controls—all mechanical and manual controls are outside the lamphouse itself.

Dual feeding means — both positive and negative carbons are fed independently by separate feed screws.

Optical excellence—so designed for a 14-inch mirror as to match perfectly an *f*/2.0 coated lens.

Modern housing—solid cast aluminum instead of the conventional sheet metal.

Novel control panel—all manual controls and an ammeter on a compact panel of high visibility at the rear operating side of the lamp.

Unique arc stabilizer—a simple yet positive-acting steel loop replaces the cumbersome behind-the-reflector magnet.

Arc imager—visible from any viewing angle.

Precise carbon positioning—both vertical and horizontal negative alignment means provided.

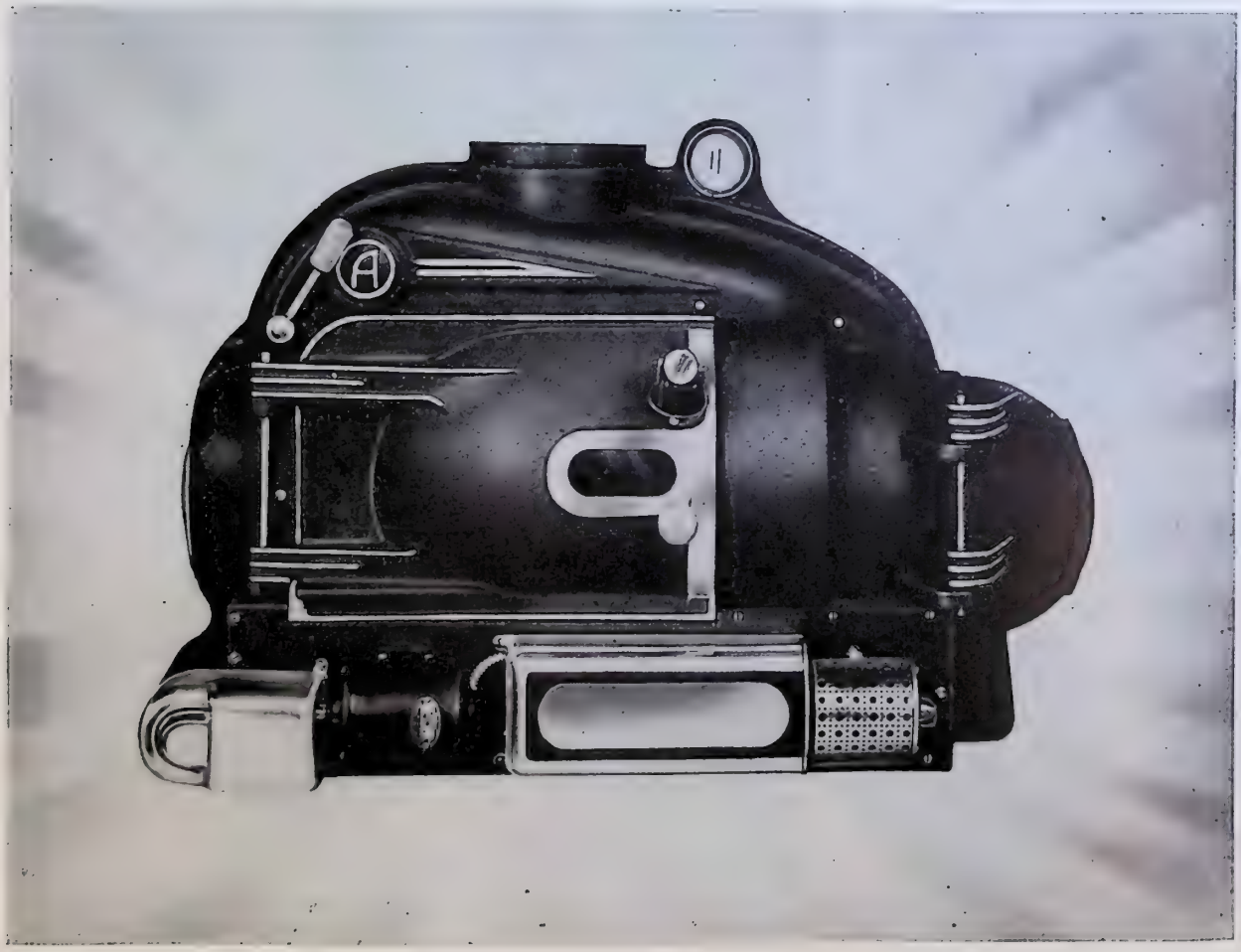
Non-slip duplex clutch — eliminates pawls and ratchets, locking positively after each feeding cycle.

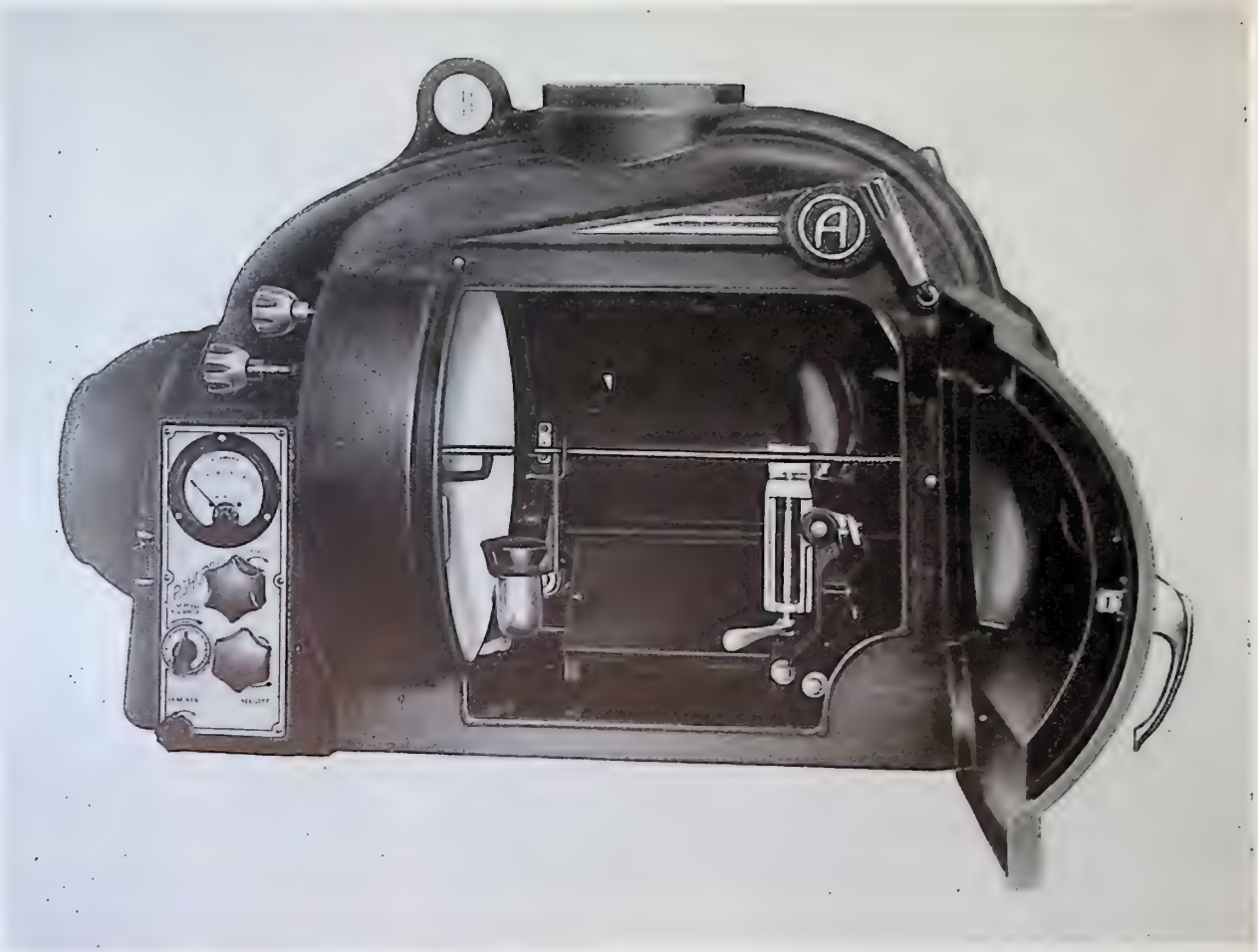
Non-wearing, oilless shafts—full ball-roller, and self-oiling bearings throughout.

Uncluttered lamphouse—no rods, pans, wires, and so forth.

The constantly increasing number of color films poses a very serious problem in screen illumination for even the smallest theatres. The so-called 1-kilowatt lamp is rapidly becoming obsolescent for just this reason: it has a very limited range (40-42 amperes); an inefficient optical system (not adaptable for the fast *f*/2.0 lens), and a single non-variable-ratio feed screw which defies even constant manual adjustment by the projectionist.

EXTERIOR VIEW of the Ashcraft C-70 lamp shows the grouping of all mechanical and control parts in a single element wholly outside the lamphouse. The advantages of a solid cast aluminum housing, including doors, over the conventional sheet metal type are obvious in terms of lighter weight, greater resistance to denting and rusting, and general superior durability. The C-70 is designed for satisfactory operation without forced ventilation or any other extraordinary precaution. Openings are provided for natural draft without interfering with the arc's stability.





INTERIOR VIEW of the C-7 carbon arc lamp, showing the 14-inch reflector, arc alignment, arc stabilizer, door baffles, and carbon drip cup, reveals the absence of any working parts outside the housing. Highly visible manual control, with its associated ammeter, is shown at the left. The new projection arc embodies several major features and many others which constitute a departure from the conventional design of equipment. The lamp operates on 40 to 65 amperes, with a dual feed so that both positive and negative carbons are fed independently by separate screws.

Single-feed-screw lamps have long been discredited in the light projection field—by the exhibitor because of their constantly varying quantity and quality of light, and by the projectionist for the same reason plus the necessity for constant manual adjustment of the controls.

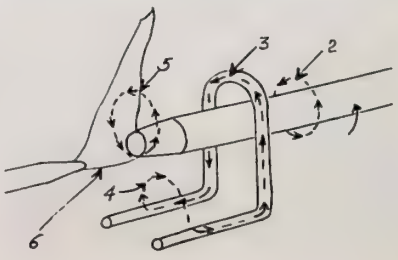
But even the larger-capacity Suprex lamp operating at the top limit of 65-68 amperes with a 14-inch mirror may fail to provide adequate screen illumination because it is not optically correct—that is, it is not properly designed to coordinate with the new fast lenses. Most of the large-capacity lamps now in use suffer from this deficiency.

The primary requisite for any Suprex-type lamp, irrespective of current capacity and solely because of the critical nature of this type of arc, is the combination of precise control of both negative and positive carbons (only possible by means of a dual feed), and a highly efficient optical system. This combination must be provided for in the design and built into the lamp; there can be no revamping of the elements once the lamp is built.

It is just this happy blending of hair-line arc control and fine optical system inherent in its design that enables the Ashcraft C-70 to encompass the wide current operating range that it does. From 40 to 65 amperes, and at all intermediate levels, control units and optical system work as a team to produce fine projection.

It is fallacious to attempt to utilize a fast lens of the order of *f*/2.0 or better with a lamp the optical system of which is *f*/2.3, *f*/2.5, or *f*/2.8, which is the range covered by most lamps now in operation. The speed of the slower unit, whether lens or mirror, determines the over-all optical efficiency of the lamp. A hybrid combination of fast lens and slow mirror, or vice versa, is not efficient projection.

ARC STABILIZER METHOD: Positive carbon (1) extends through loop (3). Magnetic flux (2) exerted at (4), forcing up gas ball (5). Ideal arc is when edge of flame (6) is almost straight.



On the C-70 lamp no mechanical changes of any nature are required to effect the transition from the lowest to the highest current levels (40 to 65 amperes). Using an 8-mm.-7-mm. Suprex carbon trim at 65 amperes, the C-70 will not only enable an optical speed of *f*/1.9 but will compare favorably in terms of quantity and quality of light output with a straight high-intensity lamp using 13.6-mm. carbons and pulling 125-130 amperes.

Considering the steadily increasing number of color film releases, no exhibitor, irrespective of how small a screen area he utilizes, can afford to be without the protection given by this reserve lamp current capacity.

Contributing greatly to the efficiency of the C-70 arc control is a radically

new duplex clutch. With the positive carbon fed forward at an adjustable uniform rate, it is imperative that the negative carbon be fed forward precisely at a predetermined intermittent rate.

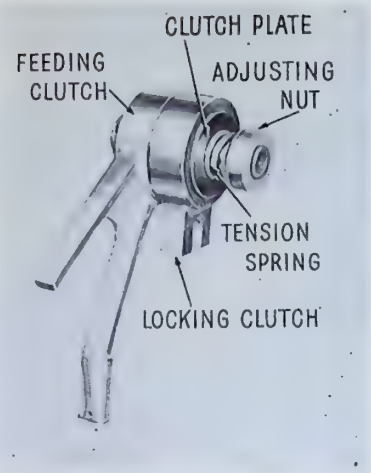
Pawls and ratchets are in general unsatisfactory for this job; while single-friction clutches tend to operate erratically. Not only must the negative carbon be fed forward precisely at predetermined intervals, but some means is necessary to lock positively the feed mechanism in position while the oscillating clutch moves into position for the next forward feeding cycle.

The C-70 duplex clutch does this job admirably. Two extremely accurate triplex roller clutches are mounted on the feed shaft: one oscillates and feeds the carbon forward; the other locks positively and prevents even the most minute slippage in the predetermined feeding rate of the oscillating member.

Each of the six rollers employed (three for each member) are ground to a tolerance of 1/10,000 inch and are hardened to resist wear. An unlimited number of feed ratios are available through finger-tip control.

This precise feeding of the carbons means that the positive carbon crater will remain at the point of maximum effective focus of the reflector, and that the negative carbon will be held exactly at the proper arc gap—that is, at a predetermined distance from the positive crater. This insures screen light of maximum brilliancy with insignificant light variation—in short, a dollar's worth of screen illumination for every dollar expended on current and carbons.

Another vitally important control element in a Suprex lamp is the means employed for stabilizing the arc flame. This has been accomplished heretofore by placing cumbersome magnets of various kinds behind the reflector. Such magnets may burn out and deteriorate over a period of time as a result of continuing exposure to the intense heat of the arc.

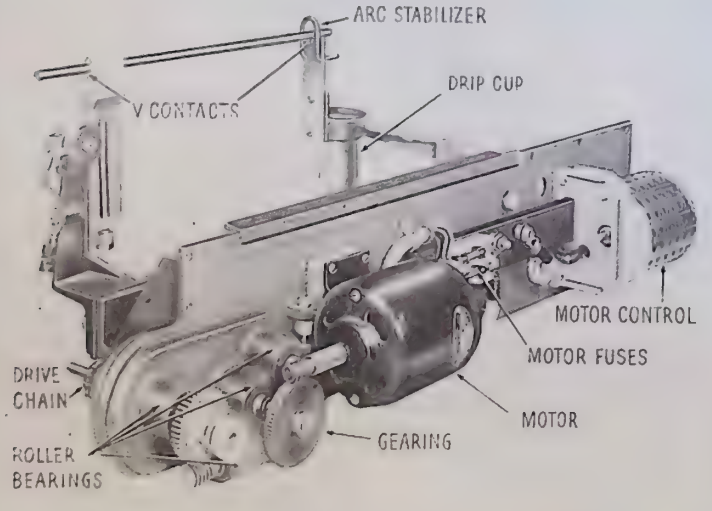


DUPLEX NEGATIVE CARBON FEED CLUTCH affords the control and renders slippage almost impossible. Shown are feeding clutch, clutch plate, adjusting nut, tension spring, and clutch.

The exclusive Ashcraft C-70 method of arc stabilization utilizes a loop of steel which, mounted on the carbon guide, surrounds the positive carbon. The ends of this loop are bent under the arc a distance equal to the protrusion of the carbon through the guide.

This loop is magnetized only when the arc is burning. The magnetic flux encircling the positive carbon is collected by the loop which, through induction, exerts an upward magnetic force and thus stabilizes the arc by forcing upward the gas ball at the end of the carbon. Only by this means can the magnetic stabilizing effect be exactly proportional to the current flowing in the arc.

COMPLETE MECHANICAL ASSEMBLY (with covers removed) of the C-70 is wholly outside the housing. Also shown is burner element and arc stabilizer. Among other elements seen are the chain drive, roller bearings, gearing, motor, motor fuses, motor control, drip cup, arc stabilizer, and V-contacts. The entire mechanism—motor, gears, shafts, rheostats, and the like—is positioned outside lamphouse.



The advantages of unit construction in general are so well known as to require little elaboration. In the Ashcraft C-70, however, this principle has been carried through to its ultimate conclusion as far as carbon-arc lamps are concerned. The entire mechanism—motor, gears, shafts, rheostats, and so forth—are contained in one compact, neatly covered, removable element positioned outside the lamphouse. The covers are easily removed for inspection and care of the element.

In fact, there is practically nothing within the lamp housing proper except the carbons and their holders, a drip cup, and a small steel stabilizing loop. Mechanisms in close proximity to the intense heat and inevitable ash of a carbon arc not infrequently deteriorate rapidly and occasion erratic arc behavior, thus nullifying the effect of even the most precise controls.

The C-70 type of unit construction is also a boon to speedy servicing should the occasion arise: the element need only be detached from the lamphouse frame (a few minutes' work) and as quickly replaced by another. Thus, a supply dealer or a group of theatres in a given area need have only one, or at most two, spare elements on hand to meet any emergency.

All manual controls, too, are outside the lamphouse, mounted compactly on a panel on which all controls are clearly indicated. This panel also mounts an ammeter. This positioning of both the mechanical elements and manual controls outside the housing is a great convenience for the projectionist, aids operating efficiency, and is vitally important in preventing wear.

Still another aid to projectionists in maintaining maximum screen illumination is the ease with which carbon line-up and adjustment is made. The carbons do not tilt nor do they require continual manual tinkering. If either vertical or horizontal adjustment of the negative carbon is required, the carbon is not tilted but is adjusted quickly and accurately from the control panel outside the lamphouse.

A word of caution as to oiling. The C-70 feed mechanism will require absolutely no oiling for many years. Using ball-bearings on the high-speed shaft and roller-bearings on the medium-speed shaft, the C-70 utilizes a new oil-impregnated bearing on the oscillating and low-speed shaft. This latter bearing actually lubricates itself from within, being a highly compressed powdered metal which has been impregnated with sufficient lubrication for its lifetime.

The advantages of a solid cast aluminum housing, including doors, over the conventional sheet metal type are obvious in terms of lighter weight, greater resistance to denting and rusting, and general superior durability.

The arc imager is visible from any viewing angle, thus enabling the projectionist to maintain constant surveillance of arc status and of general operating conditions.

The C-70 lamp is designed for satisfactory operation without forced ventilation or any other extraordinary precaution. Openings are provided in the housing for natural draft and are so arranged as to offer not the slightest interference to arc stability.

Tube-Type Rectifiers for Projection Arcs

Line of Models of Two, Four, or Six Tubes Satisfy D.C. Requirement up to 80 Amperes

R. H. Heacock
RCA Victor Division, Radio Corporation of America

Conventional arc lamps employed in motion-picture equipment require direct current—that is, current flowing constantly in one direction.

The sources of power usually available furnish alternating current—that is, current that changes its direction of flow at regularly timed intervals. Two of these successive changes of direction constitute a complete cycle, and most power circuits have a change frequency of 60 cycles a second.

The conversion of alternating current to direct current is the business of the tube-type rectifier. Already in use for many years, tube-type rectifiers are, perhaps, the most economical in original equipment cost.

THE HOW AND WHY

Simply speaking, the tube-type rectifiers in most general use employ two or more rectifier tubes, in conjunction with a transformer. The rectifier tube functions as a kind of "one-way valve," permitting electric current to flow through it in only one direction. The transformer is used to step-down the line voltage to the voltage desired.

If one tube is connected in series with the secondary of the power transformer, only current flowing during half of each cycle will pass through the tube, resulting in a direct pulsating current. This arrangement is called a half-wave rectifier.

If two transformer secondary windings are used, with a tube properly connected in each winding, one tube will pass current flowing in one direction during each cycle, and the other tube will pass current flowing in the opposite direction during each cycle. The direct pulsating current flowing from both tubes is then fed into a common circuit in such a way as to produce a steady direct current.

Tubes are limited in their current-carrying capacity. By connecting two or more tubes in parallel in each transformer winding, the amount of available direct current can be increased. Likewise, direct current from rectifiers operating on multiple-phase circuits may be added to provide for greater current requirements while equalizing the load on all phases of the circuit.

THE NEW LINE

Incorporating the latest advances in the design of tube-type rectifiers with circuits already tried and proven through years of use, the RCA rectifier line includes features that make them outstanding in point of trouble-free and economical service. The unusually rugged electrical design utilizes ample masses of both steel and copper, providing low operating temperatures and long life.

Electrical circuits in these rectifiers are the results of years of experience and are designed around schematics also in use for many years. Where balanced tube loads are required, interphase of balancing transformers are used on all designs. While these are more expensive, they guarantee accurate tube balance.

Totally enclosed, rugged, toggling, rotary tap switches are used on all models of these rectifiers. The switches feature insulated dead shafts, continuous rotation in either direction, 12 pounds spring pressure to the contact, and the use of completely non-carbonizing materials throughout.

Chimney draft ventilation on all models assures lower operating temperatures. Steel cases are streamlined and rugged, and attractively trimmed in chrome and red. Simplified mechanical construction permits ease of maintenance and servicing.

Optional equipment on RCA's rectifiers are ammeters, which indicate the output amperage available.

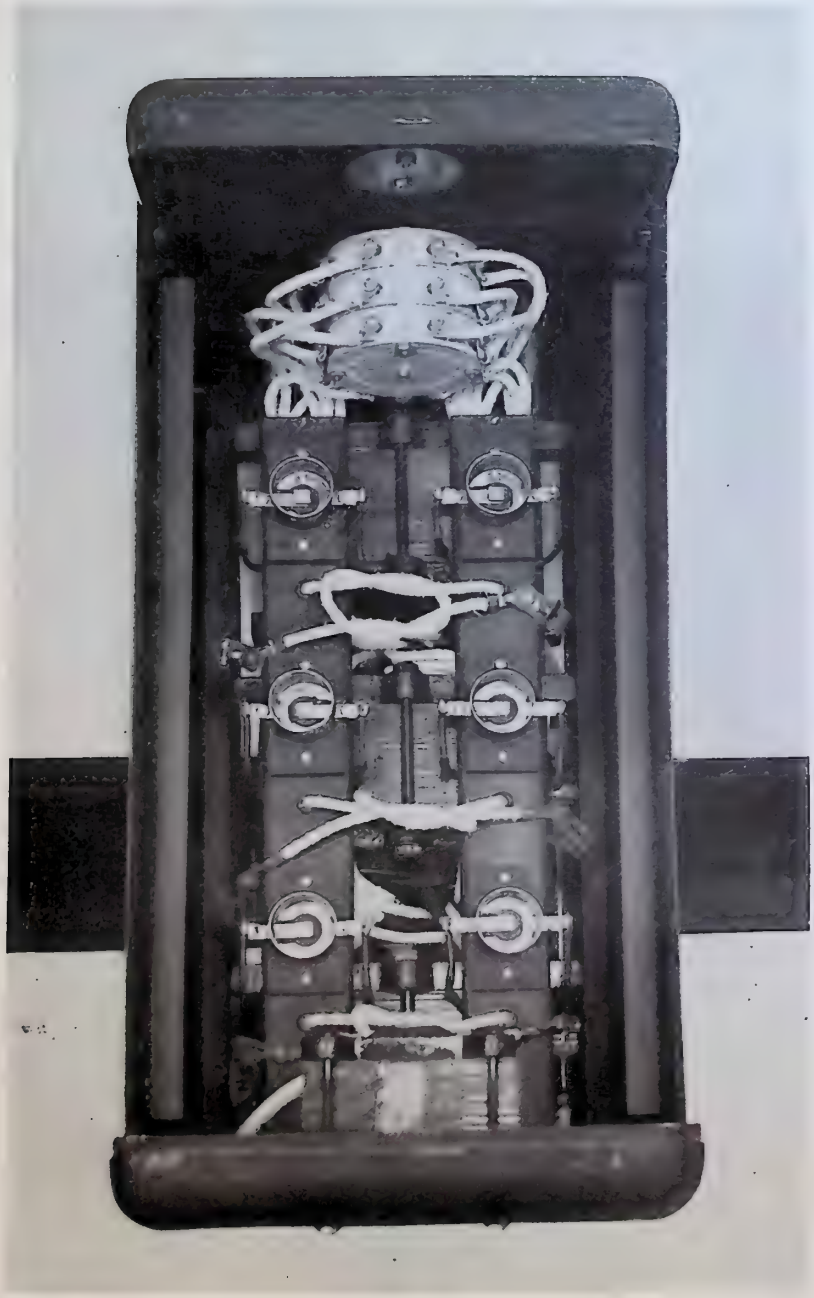
THE TUBE-TYPE RECTIFIERS, in the new line from the Radio Corporation of America, are housed in streamlined, rugged steel cases, attractively trimmed in chrome and red. The perforated metal top of the unit lifts off for easy accessibility to all parts and components. The control knob of the rotary tap switch will turn in either direction. Such rectifiers are said to be most economical in first cost.

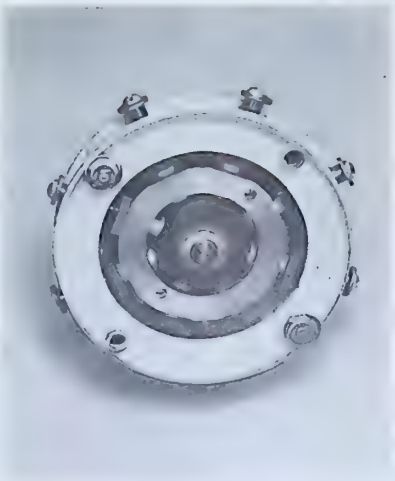


TABLE 1—General specifications on the eight models of RCA tube-type rectifiers, giving details as to tubes, and the input and output characteristics.

MODEL	TUBES			INPUT		OUTPUT	
	Number	Phase	Amperes	Volts	Amperes	Arc Volts	Arc Amperes
30 A-1	2	1	15	115	60	50	18-30
30 A-2	2	1	15	230	60	50	18-30
40 A-1	4	1	15	115	60	27-28	41-43
40 A-2	4	1	15	230	60	27-28	41-43
50 A-2	4	1	15	230	60	27-33	40-50
60 T-2	4	3	15	230	60	27-38	40-60
70 T-2	6	3	15	230	60	34-40	60-70
80 T-2	6	3	15	230	60	35-42	60-80

WITH THE TOP REMOVED, the tubes and components of the rectifier are easily accessible. In the picture, the tubes have been removed, as the unit is prepared for shipment. Six-tube rectifiers of this type can be obtained to deliver either 60 to 70 arc amperes or 60 to 80 arc amperes. Both the 6-tube types operate on an input of 230 volts and 60 amperes. Many theatres are using tube-type rectifiers.





ROTARY TAP SWITCHES are included on all the tube-type rectifiers. Fully enclosed, the switches will rotate in either direction. They are manufactured from non-carbonizing materials.

Sample of these rectifiers have already been submitted to Underwriters' Laboratories for approval.

MODELS AND USES

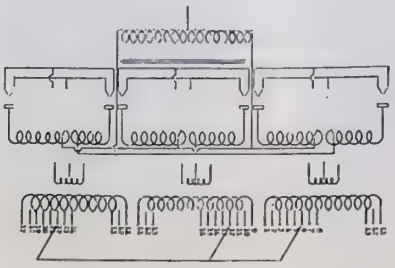
The line of tube-type rectifiers, recently announced by the Radio Corporation of America, includes models using two, four, and six 15-ampere rectifier tubes with input and output requirements to meet the needs of all motion-picture arc lamps of less than 80 amperes direct-current consumption. Detailed specifications to facilitate selection of the proper rectifier for any given type of equipment are given in Table 1.

Model 30 A-1 and Model 30 A-2, of the two-tube type, are for use with low-intensity lamps.

In the four-tube group of rectifiers, Model 40 A-1 and Model 40 A-2 are for use with the Brenkert Radarc and other 1-kilowatt arc lamps. Model 50 A-2 and Model 60 T-2 may be used with either the Brenkert Radarc (1 kilowatt high-intensity) or the Brenkert Enarc and such other general all-purpose high-intensity lamps as the Strong 1-kw., the Simplex-High, or the Peerless Magnarc.

Two six-tube rectifiers are represented. Model 70 T-2 and Model 80 T-2 are for use with general purpose arc lamps, such as the Brenkert Enarc or the Peerless Magnarc when a 7-mm. or 8-mm. carbon trim is used.

TYPICAL SCHEMATIC DIAGRAM of Model 80 T-2, the 6-tube, 15-ampere, 3-phase rectifier designed to deliver 35 to 42 volts at 60 to 80 amperes at the arc, from 230-volt, 60-ampere input supply.



Notes on the New Models of In-Car Speakers

Manufacturers Describe Some of Their Items To Deliver Better Quality Sound to Patrons

The success of the drive-in theatre is dependent to an important degree on the quality of its sound reproduction. As the result of experience with many installations a great deal has been learned about the types of sound systems which provide the most satisfactory results.

Early theatres were limited to the use of large broadcast-type speakers at the screen. These were found unsatisfactory in many localities as residents in the immediate vicinity complained of spill-over sound and theatre owners frequently found themselves in trouble as disturbers of peace. This condition led to the development and the steadily increasing popularity of the individual type speaker until today 80 per cent of all drive-in theatres use speakers of this type.

Up to the present time there have been five general types of individual speakers used. These can be classified into those permanently mounted beside the car and those which can be taken inside the car, commonly called the in-car speaker. There have been three types of the permanently mounted speakers: (1) permanently mounted on bulkhead in front of car, (2) permanently set in the ground between cars and covered with a metal grille, and (3) permanently mounted on a pillar beside the car window.

The majority of drive-in theatres being constructed are opened with in-car type speakers. The many advantages of this type of speaker over all others have given it almost universal acceptance throughout the field.

In the following paragraphs some of the later developments in the field of drive-in theatre sound and speaker systems is presented, condensed from the companies' own material without editorial comment.

AUTOCRAT

A new company has brought a new product again to the front in the theatrical field. This line of in-car speakers was designed and produced by Autocrat, Inc. The lowly in-car speaker for drive-in theatre use has at last become of age and has now graduated from the horse-and-buggy stage and takes its place as a newly designed modern, practical and worthwhile piece of theatrical equipment. No longer is the in-car speaker merely a box with some sort of speaker arrangement mounted therein.

These speakers have been in development for better than two years, but it was felt best to hold off presentation to the trade until such time as all parties concerned were satisfied with the speaker in its final form. Both the labor and material situation had to be taken into consideration. As a result of the checking of many designs and tests and requirements demanded, the following are features which theatre owners cannot help but acclaim with enthusiasm.

The new line of speakers is available in three models, the Superchrome is a chrome-plated masterpiece of shining beauty. Both the Deluxe and the Master units come in an all-weather lacquer finish with choice of color desired. Deep formed louvers and a special front contour are rain-repellant. For the first time, architectural design for eye appeal has been applied with the flowing teardrop lines following right through with mechanical and electronic perfection with the utmost in operating quality. These new in-car speakers reflect outstanding tone resonance and acoustic values. Full volume is obtained without distortion or vibration which coupled with high fidelity and base reflex now bring theatre quality reproduction to your own car. "The Voice of the Car" (copyright applied for) is truly a worthwhile name for this masterpiece of drive-in theatre equipment.

The outstanding development in either the concession or theatrical field, is the concession signal, a small toggle switch located at the top of the speaker instantly lights a small signal on top of the junction box located between cars thus enabling the car hop instantly to know which car is desiring service. Each junction box has two lights—one is for the speaker or car on its left, the other is for the speaker or car on its right. No more rude interruptions to your patrons when service is not desired. No more staggering through the dark to the concession stand while the show is in progress. No more long waiting in line at concession stand during intermission. For the first time your concession stand can make money during the entire show period. Best of all no additional wiring is required for present operating drive-

THE AUTOCRAT SPEAKER has, as its particular contribution, the concession signal, a small toggle switch located at the top of the speaker which, when turned on, lights a small lamp on top of the junction box between cars. This lamp is also so wired that it lights in case a speaker cord is broken, a speaker is disconnected or taken away, and when general amplication volume exceeds the peak.



in theatres and only the usual 2-wire cable is required for new installations. Thus it becomes a simple problem to replace old style speakers or to install a new theatre installation.

The new Deluxe speakers by Autocrat are so designed that the concession signal also acts as a safeguard to your theater operation and maintenance.

Automatically the same box signal as used as a concession signal supplies automatic lights under any one of the following conditions: (1) In case a speaker cord is broken, (2) if the speaker itself is disconnected or taken away, or (3) if for any reason the operator permits his general amplification volume to get beyond the proper or safety peak; then and in that case all signal lights come on and all posts light up. As someone connected with the theatre will immediately notice this condition. a possible blow up of the sound system can be prevented.

All of these features are obtained without any additional wiring or labor expenses and are incorporated as a basic part of this speaker.

Instant-on junction box post connections have forever eliminated the expensive problem of the cld style threaded pipe and connections now in use. Under this new system your junction box just sits on the pipe and is held there tight by the quick turn of two special screws with a wrench furnished. Only a few seconds at the most and your installation is complete. Time and labor savings are tremendous. Once on the post this junction box never has to again be moved. Its all-weather condition and finish is made to weather season after season.

Instant clip speaker plugs have now removed all the work and time normally consumed in the initial installation and in the spring and fall maintenance problem. No more effort is required to connect or to disconnect this super plug than would be used ordinarily in plugging in your own floor lamp at home. A lock clip prevents any tampering by your patrons, once the speaker is plugged into the junction box connection. A dummy plug is available which can be inserted during the winter months in place of the regular speaker plug while the speaker itself is in storage, thus making removal of the all-weather junction box unnecessary.

Speaker cases have no exposed screws to tempt the patrons to trifle or play with the case, it having been sealed at the factory at the time of manufacture. However provision has been made for simple access to the case when necessary to replace a broken cable, and so forth. Speaker cases as well as the junction boxes are available in either a full chrome plated finish or in an all-weather lacquer. Choice of color in regular finish is permitted at no extra charge where ordered special with sufficient time to permit such.

A complete five year service guarantee of unheard scope makes this speaker your outstanding buy if for no other reason. Complete repair and operation of any of these speakers at any time within a five year period. For a replacement charge this guarantee holds, even if the speaker has been run over, mashed or completely damaged in any respect. Thus, this guarantee covers both the electronic and mechanical parts as well as the physical parts of the speaker.



THE DeVRY SPEAKER is of the permanent-magnet type with a 5-inch cone mounted in a weather-proof metal baffle having a louver-type grille. A bracket is provided for attachment to the speaker post when not in use or to the car window or sun visor by patrons during the show. Heavy-duty, rubber-covered speaker cable of sufficient length is provided to let the speaker be taken inside the car.

DE VRY

The DeVry speaker unit is a permanent-magnet type with a 5-inch cone mounted in a rugged weather-proof metal baffle having a louver-type grille. Individual volume controls are provided. A bracket is provided for attachment to the speaker post when not in use or to the car window or sun visor by patrons during the show. Heavy-duty, rubber-covered speaker cable of sufficient length is provided, to permit the speaker to be taken inside the car.

The terminal box is a weather-proof metal box, designed to be mounted on the 1½-inch conduit that serves as the support stand for the assembly. The box contains a matching transformer and terminal lock for speaker attachment. The metal post and conduit are supplied by the customer.

Important advantages of the new equipment are said to include (1) superb sound reproduction, high intelligibility of voice, spoken word, or sound effect, and music which is life-like in reproduction; (2) car windows can be kept closed in wet or cool weather, permitting the theatre to open earlier in the spring and to close later in the fall; (3) individual volume control, which can be adjusted to each individual customer's satisfaction, with all the reproduced sound distinctly heard by the patrons in the car; (4) the sound is confined to the theatre area, eliminating annoyances to the surrounding community; (5) the sound reaches the patrons parked farthest from the screen in perfect synchronication with the picture; and (6) a bracket attached to the speaker permits it to be hung on the edge of the car window, sun visor, or any convenient spot inside the car.

All speakers have been tested and proved safe against moisture and high temperature.

INTERNATIONAL PROJECTOR

The International Projector Corporation, early to realize the necessity for providing drive-in theatres with equipment engineered especially for such application, have made available sound systems which provide the same unmatched performance in theatres of all sizes.

Ease of installation, maximum economy of operation, dependability, easy maintenance, and emergency standby features are but a few of the many reasons why Simplex drive-in theatre sound systems are used in many of the leading theatres everywhere.

Simplex deluxe rotary stabilizer sound mechanisms, the same sound mechanisms that are used in all other Simplex sound systems, are employed to insure uniform film motion essential to perfect sound reproduction.

Simplex driver amplifiers and Altec-Lansing 250-watt power amplifiers provide sound quality and reserve power hitherto not available in drive-in theatre



THE NATIONAL (IPC) SPEAKER is a 6½-inch, permanent-magnet type unit, mounted in a durable aluminum cabinet to permit utmost lightness for ease of patron handling. It is water-proof and contains a high-quality volume control conveniently located to allow individual selection of volume.



The combination heavy aluminum shelter and coupling unit has been designed to protect two in-car speakers against the most adverse weather conditions. If so desired, a coupling unit may be provided which is for mounting two speakers but does not afford protection against weather.

applications. All amplifiers are cabinet mounted to conserve valuable projection room space and permit instantaneous tube or electrical component servicing in case of emergency. Full power emergency operation is provided through a simple switching arrangement.

The ramp control panel permits the projectionist to maintain direct control over distribution of sound to each ramp in the theatre. Isolation of any ramp or combination of ramps may be made immediately in case of emergency so that the show may go on in the balance of the theatre.

To meet the growing demand, International Projector has designed an in-car speaker utilizing the finest components available to provide incomparable sound quality to the drive-in theatre patron.

This 6½-inch speaker is mounted in an attractive, durable aluminum cabinet to permit utmost lightness for ease of patron handling. It is completely water-proof and contains a high quality volume control conveniently located to allow individual selection of volume.

A combination heavy aluminum shelter and coupling unit has been designed to properly protect two in-car speakers against the most adverse weather conditions.

If so desired, a coupling unit may be provided which presents facilities for mounting two in-car speakers but does not offer protection against weather conditions.

MOTIOGRAPH

Two drive-in theatre sound systems, with central loudspeaker systems, with power outputs, respectively, of 75 and 150 watts, have been announced by Motiograph, Inc.

For the drive-in theatre using in-car or post-type speakers, Motiograph offers three additional systems of 150, 250 and 500 watts of power output.

The largest sound system is capable of serving the power requirements of individual in-car speakers for more than 1,800 cars. This system has emergency provision permitting the operation of the system at 40, 250, or 500 watts.

The Motiograph in-car speaker is fabricated from heavy gauge drawn steel, plated and finished in light blue enamel. The front side has a perforated area over the speaker unit cone. The rear side is provided with a special rubber covered hook to enable the speaker to be supported at any desired position in the car. A constant impedance volume control is mounted in a recess in the front side so that its operating knob is well protected from damage during speaker handling. The heavy duty moisture-proof connection cord is six feet long; the hook design provides a place to wind it up for storage.

The in-car speaker is weather-proofed, the cone being water-proofed and the metal parts are treated to resist corrosion. The speaker unit itself is of high quality manufacture and is larger than most competitive in-car speakers. The characteristics of this unit are exactly

THE MOTIOGRAPH SPEAKER is fabricated from heavy-gauge, drawn steel, plated and finished in light blue enamel. The front side has a perforated area over the speaker cone. The rear side is provided with a special rubber-covered hook to enable the speaker to be supported at any desired position in the car. A constant impedance volume control is mounted in a recess in the front side so that its operating knob is well protected from damage during speaker handling. The heavy-duty extension cord is 6 feet long. The hook design provides a place to wind it up for storage.





matched to the acoustical characteristics of the speaker housing resulting in exceptionally good tone quality.

The SE-7535 in-car speaker shelter and junction box is designed on the same principle as rural mail boxes. It has a flanged metal base section which may be mounted either on a 2-inch pipe post or on a standard wooden fence post. The ends are slotted to permit the speaker cords to hang downward. Terminal blocks are provided near the center for the speaker and feed cables, and the impedance matching transformer for two speakers is adjacent to them. Transformers are available with any desired primary impedance up to 14,000 ohms.

Speaker shelter compartments and a center transformer compartment are provided by the formed metal cover for the base section. It has flanged and hinged doors at either end, and fits snugly down over the base section to provide entirely adequate weather protection for two SE-7530 in-car speakers. With the supporting posts properly located between each two car positions, the speakers may be taken out of or be placed in the shelter compartments without the necessity for getting out of the cars. Provision is also made for clamping two speakers to the sides of the shelter box to give the patron even quicker access to the in-car speaker.

The metal parts are fabricated from heavy gauge galvanized sheet steel finished in light grey weather resistant paint. This basic design permits the shelters to be repainted to any desired color after installation and to be refinished easily during seasonal theatre overhauls. The transformer circuit is so arranged as to prevent accidental speaker cord shorts from disturbing other speaker pairs on the same ramp feed line.

The Motiograph in-car speakers may be expected to last for a long time so long as they are properly sheltered when not in use.

Unsheltered speakers may hold up for a season or two in mild climates, but best professional opinion among competent quality speaker designers is that replacement costs will be very heavy thereafter due to cone failures, to corroded metal parts, particularly the iron and steel components in the speaker unit magnetic structure, and to general deterioration caused by exposure to the elements.

RADIO CORPORATION

A weather-proof and fool-proof in-car speaker, terminal box, and speaker-receptacle unit for drive-in theatres, designed for permanent location on the parking ramps, is now in production and ready for distribution, the RCA Engineering Products Department has announced.

Rugged, compact, and designed to withstand all kinds of weather, the new speakers are mounted in brackets, one at either end of a terminal box to be installed between two ramps, within easy reach of patrons from their car windows. This eliminates excessive handling and delays involved under the old system used by some drive-in theatres, where a speaker was passed out to each car as it drove in, plugged into a terminal at the ramp by an attendant, and turned in at the exit as the patron left.

One feature of the new speaker is the use of a new type of coiled speaker cord which enables the patron to place the speaker anywhere within the car without the tangling and dragging of a long straight cord.

The individual in-car speaker eliminates many problems inherent in centralized speaker systems. It permits use of the speaker with the car windows closed in cold weather, thus extending the length of the regular operating season. The in-car speaker also has an adjustable volume control, enabling patrons to adjust the sound level to their own satisfaction. The speaker itself is of special design for acoustically correct operation inside a car. An attached bracket makes it easy for the patron to attach the speaker to the car window or any convenient support inside the car.

RCA's combined terminal box and speaker receptacle unit has been so designed that a short circuit in the speaker unit or cord can affect no more than the two speakers connected to any one terminal box. This permits all other speakers to continue normal operation in case of trouble in any one unit, and facilitates location of the trouble. Formerly, a short circuit in even one speaker could put a whole line of speakers out of operation until the trouble could be located and corrected.

Built to take a lot of hard handling, the new speaker has been tested under extremely adverse conditions and found to be able to withstand greater variation in temperature and humidity than would ever be encountered in actual operation.

The new type neoprene-covered extension cord is sixteen inches long in its retracted form, and can be stretched to about four and one-half feet with a pull on the speaker unit of only one and a half pounds. If neccessary, this cord can be stretched to a mixiumum of approximately seven times its retracted length, or about nine feet. Since the cord covering is treated with a sunproofing wax, it can be exposed to the hot sun over long periods of time without deterioration.

The new in-car speaker and receptacle are part of a complete new line of drive-in theatre equipment. One of the features of the new sound system is an arrangement for keeping the sound level constant regardless of the number of speakers in use, once the line volume has been adjusted.

The tubes used in the new amplifier system cost less than one-half as much per watt output as tubes used in prewar systems. This sound system reduces materially the cost of operation and brings to the drive-in theatre the high quality and dependable performance.

THE RCA SPEAKER is a weather-proof, fool-proof in-car device, with a terminal box and speaker receptacle unit, designed for permanent location on the parking ramps. The new type neoprene-covered extension cord is coiled and 16 inches in its retracted form, but can be stretched to 4½ feet with a pull on the speaker unit of only 1½ pounds. If necessary, the cord can be stretched to 9 feet.



Hearing Aids Bring Important New Revenue

Correct Installation, Accepted Management Will Attract 20,000,000 Extra Admissions

GRACE E. BLOOMER
Acousticon Division, Dictograph Products, Inc.

One of the truly satisfying developments which the fast pace of wartime electronic research has made possible is the evolution of modern aids to hearing. Outstanding advances have been accomplished not only in design and performance, but in the even more important factor of public awareness of hearing deficiency. Today, the use of aids to hearing, whether personally owned or installed for group use in public meeting places, is enjoying a public acceptance approaching that of eye glasses.

Many alert theatre owners and managers, recognizing this fact, have bid for the patronage of America's hard-of-hearing public by providing thousands of handicapped persons with the mechanical means to enjoy motion pictures and plays, thus earning a greateful and steady audience for their business.

No theatre is too large or too small for a hearing-aid system. Great chains have carefully checked their possibilities and performance and installed them. RKO houses are thus equipped, including the world-famed Radio City Music Hall. Warner Brothers theatres have them. The Karl Hoblitzelle units feature them. Modern independents everywhere have followed the trend. The Metropolitan Opera House is so equipped.

These houses have demonstrated again and again that the intelligent use of such systems is adding an extra 10 percent to their box-office receipts—the vital 10 percent that often makes the difference between profit or loss.

ESTIMATED PATRONAGE

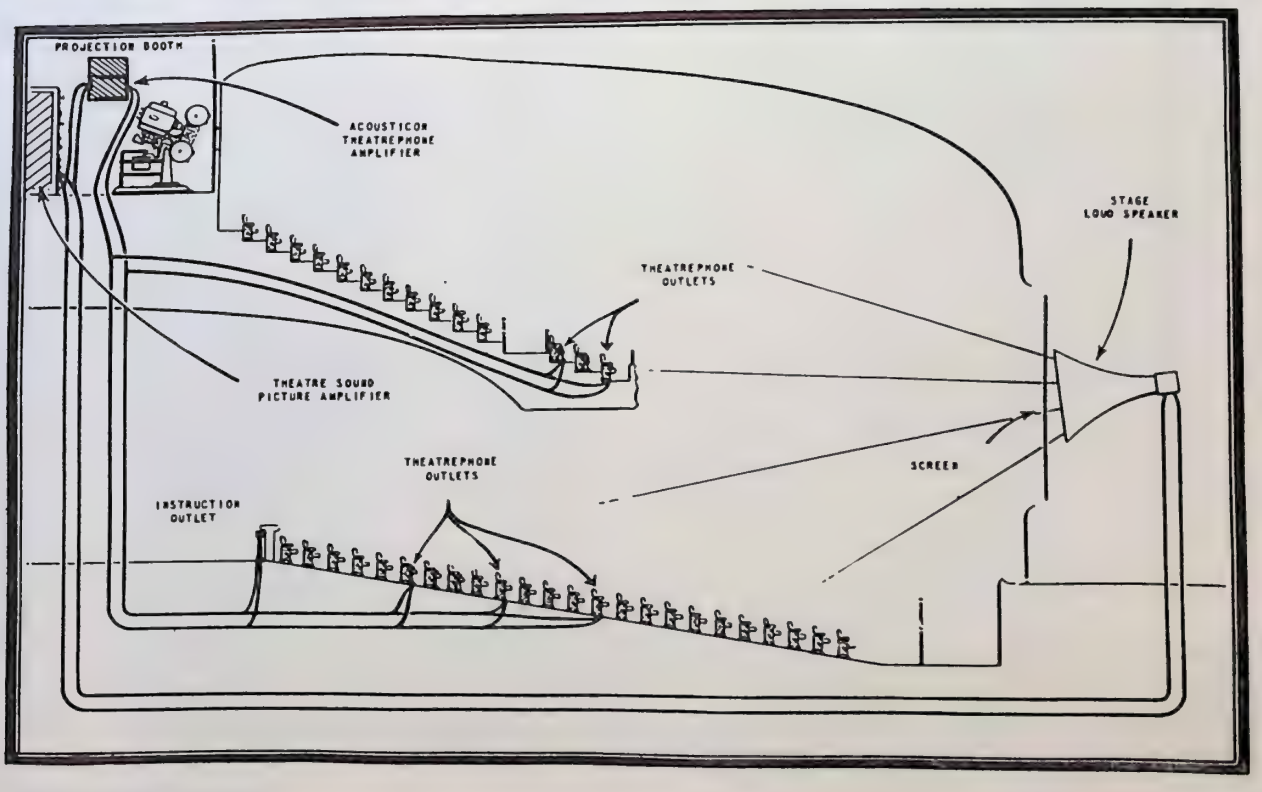
The hard-of-hearing audience is enormous.

Reliable statistics show that there are approximately 15,000,000 people in the United States with impaired hearing—more than one out of every ten Americans—and this is a conservative figure. Moreover, it is estimated that these 15,000,000 persons keep at least 5,000,000 more persons from going out to enjoy the entertainment and amusement available to those with normal hearing—for a family group instinctively seeks amusement that every member can share.

If only 10 percent of these 20,000,000 people can be brought back to the movies, one performance alone would be an increase in box-office receipts of $1,000,000 at an average admittance charge of only 50 cents. And, if these 2,000,000 were accompanied by a minimum of one family member, the possibilities are easily estimated. And, remember, this is for only one performance.

Many deafened people who use modern, highly developed individual hearing aids daily still prefer to use the theatre installation. Others cannot understand the picture at all unless the theatre is equipped to serve them. The reason for this is that the sound for the theatre hearing aid is taken directly from the sound track and, therefore, suffers no distortion or lack of power as it may when it has to travel from the loud speaker back of the screen, to the individual's hearing aid worn on his person. Others who are deafened but wear no

DIAGRAMMATIC SKETCH of a theatre is given here to show how a Theatrephone installation is made. Note especially that, while the Theatrephone lines originate in the theatre sound-system circuit from the amplifier to the loud speakers, the hearing-aid service first feeds into its own amplifier and thence to the various outlets in the theatre. In a complete installation, the theatre always provides for an instruction outlet to be set in a convenient position within the standee area so that patrons, desirous of the service but unfamiliar with the intricacies, may be properly taught.



hearing aid, feeling perhaps their loss does not justify the purchase of an individual aid, are delighted to use the hearing aid equipment in the theatre because of the relaxation and enjoyment it adds to the programs.

Hard-of-hearing folks are often lonely and patronize aid-equipped theatres more often than other people because the theatre so equipped furnishes them a strain-free type of entertainment which is an escape from their everyday existence. Often the movies represent the only outside amusement available to a deafened individual.

INSTALLATION

The ideal installation in a theatre is to have a jack-box installed on at least every other seat, thus allowing the hard-of-hearing patron to sit anywhere in the house and use the hearing aid. However, some theatres feel this is too expensive and, instead, have a certain section, or sections, of desirable seats (some forward and some back from the screen) wired with jack-boxes. These seats are reserved for the hard-of-hearing patrons.

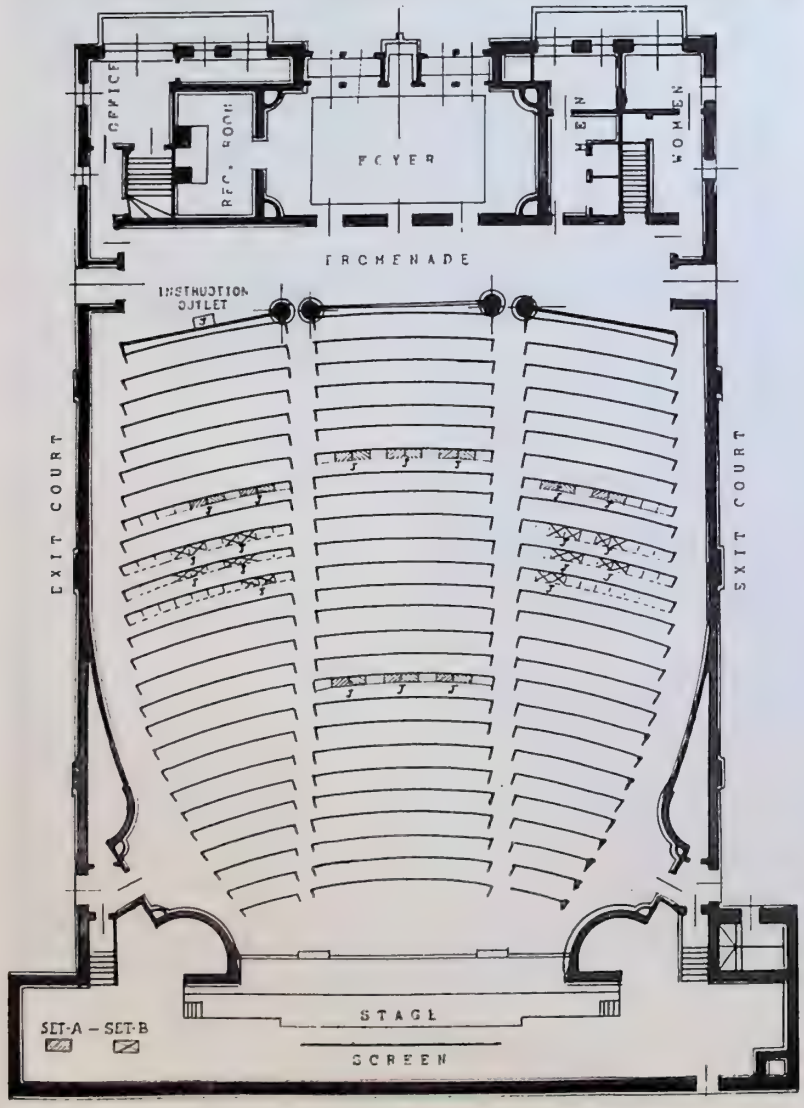
PROMOTION

Advertising, for any purpose, must be consistent, intelligent and eye-catching to pull results. A manager, with a new hearing-aid installation in his theatre, has many natural angles to follow. For example, a line should be carried indefinitely in all ads stating that the theatre is equipped to take care of the hard-of-hearing. A short trailer can be thrown on the screen also, urging patrons to tell their hard-of-hearing relatives and friends about this service.

Cultivation of groups and organizations specially devoted to, or concerned with, hard-of-hearing people is a wise investment. Every representative group has deafened members and many make special arrangements for them. Specialized groups to which appeal may be made include Leagues for the Hard of Hearing, schools and clubs for the deafened, churches, veterans organizations, retail hearing-aid offices, and service and fraternal organizations who are interested in hearing problems as part of their programs. A certain number of courtesy tickets can be furnished these groups to be given away or sold at a special price as part of the advertising promotion. Offices of the equipment manufacturer in the area consistently cooperate by inserting your program material in their regular mailings to their hard-of-hearing customers.

Consistent promotion of this kind is expanding audience area 40 and 50 miles for theatres that use these Acousticon mailing facilities.

FLOOR PLAN for placing Theatrephone installations. While the ideal situation would have a jackbox on every seat (at least, every other seat), it is generally expedient only to wire special seats in one or two special areas, and then reserve these places for the exclusive use of hard-of-hearing patrons. The diagram also shows a suggested place for the installation of the instruction outlet.



MANAGEMENT

The finest argument for continued use by patrons is the service given in the theatre. Every detail should be watched to ensure the satisfaction of the user. Preference of patrons as to distance and angle from the screen should be carefully considered so that all will be satisfied. Outlets must be in good spots, not poor spots in the house. Ushers must be instructed in the working of the system and parts. Careful checks should be made on the equipment at regular intervals to ensure maximum performance at all times. All receiver units should be wiped off with a cloth moistened with some sterlizing agent before being returned to the rack after use.

The procedure for handling the theatre hearing aid is simple. The patron asks for the aid at the box office when he buys his ticket. He signs a receipt for the receiver assembly and the receipt is placed on the hook from which the receiver is taken down and handed to him. Later when the user has established his identity and responsibility, he is issued a permanent card carrying his name and address and he presents this at the box office and receives the unit when purchasing his ticket, thus eliminating the trouble and delay of signing for it each time. This card is hung on on the hook, as before, and is given back to him upon the return of the receiver unit at the end of the performance. Management and ushers can tell at a glance how many hearing aids are in use in the theatre and can check on seating, et cetera, from this board. Ushers should also be instructed to fill the patron's request for his preference in either bone- or air-conduction receiver and handle or headband.

Properly installed and carefully exploited hearing aid equipment is bringing exceptional dividends to theatre owners and managers everywhere. An extra 10 percent in receipts, expanded audience area, increased audience appeal, inestimable good will—these are dividends worth working for and receiving.

Twenty million prospective patrons are asking for more theatres with equipment for the hard of hearing.

A rich share of this profitable market is waiting to pay its way into your theatre. The good will, the satisfaction and the loyal patronage of the extra 10 percent can make your theatre the most popular—and the most prosperous in your community.

Wireless System for Theatre Hearing Aids

A Portable Instrument Receives "Broadcast" From Audio-Frequency Induction Transmitter

A principle used by the British Armed Forces during the war for communications around bridegheads has been turned to the peacetime assignment of enabling deafened theatre patrons to hear the sounds of moving pictures from any seat in a theatre. The first American post-war installation of this type of hearing aid was made in the Miami Theatre, Miami, under the supervision of Charles S. Lehman.

The equipment—called the Telesonic system—has as its biggest advantage the fact that it requires no direct connection between the sound of the picture and the receiver which the hard-of-hearing patron uses. Thus, it is possible for the patron to sit anywhere in the theatre he wishes. The older type of hearing aid requires that hard-of-hearing patrons sit in specific seats which had direct wire connections with the sound system.

Secret of the new system is the creation of a magnetic field, circulated by a loop of wire which runs throughout the theatre. The receiver—about the size of a cigar box, with attached earphone—picks up the circulated waves by induction and transforms them into sound, amplified to suit the listener's needs.

The system is the invention of Joseph Poliakoff and Oswald Barber Sneath, of London, and, through D. Young and Company, chartered patent agents, registered in Great Britain. On August 12, 1941, through representation by the office of Norris and Bateman, patent attorneys, United States patent No. 2,252,621 was issued.

In the absence of a more elaborate technical presentation and a detailed description of installation, use, and maintenance of what the patentees call a "Method of and Apparatus for the Transmission of Speech and Other Sounds," the patent, the claims excepted, is here printed for the record.

THE PATENT

The invention relates to a method of transmitting speech and other sounds, including recorded speech and sounds, within a limited space such as the auditorium of a cinema or theatre, or a sports arena; and to transmitting apparatus and receiving apparatus for carrying the method into practice. The invention is particularly intended for assisting people who are deaf or hard of hearing to receive speech and other sounds through headphones or bone conductors by the aid of a portable apparatus. It has thus the advantage over systems of deaf aid commonly installed in cinemas and theatres, that the deaf person can hear with a small portable instrument or receiving apparatus from any seat or can move about and does not have to plug it into one of a number of fixed points.

According to this invention, the transmission takes place by audio-frequency induction between a conductor carrying an undulatory current and a pick-up coil energizing a portable receiver. The transmitting apparatus comprises a power amplifier such as is commonly used for public address and allied purposes, the output of which is delivered to a single length or network of conductors deposed about the hall or auditorium. The limited space within which the transmitted signals can be efficiently received lies within and around the coil formed by the transmitting conductor or it may be restricted to a region adjacent to the said conductor when the size of the coil or loop is very large. The receiving apparatus comprises a thermionic amplifier having combined therewith a pick-up or receiving coil which may be connected by suitable flexible leads to the apparatus, and in the case where the amplifier is a deaf aid appliance having a microphone, may be arranged so that it can be switched in to replace the microphone or it can be effective simultaneously with the microphone.

The invention is illustrated by way of example in the accompanying drawings in which:

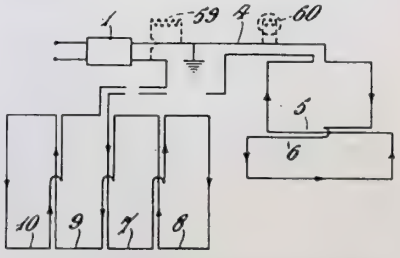
Figure 1 shows diagrammatically one form of transmitting apparatus according to this invention.

Figures 2 to 5 show modified arrangements of the transmitting conductor.

Figure 6 shows diagrammatically one form of the receiving apparatus, and

Figures 7 to 9 show modifications of the receiving apparatus.

Figure One



The output from a thermionic amplifier 1 is connected to a transmitting conductor 4 that forms loops 5 and 6 which enclose areas that are approximately equal although not necessarily similar shape. Such loops may, for example, be arranged in the balcony of the cinema and have the current flowing therein in opposite directions. Thus the direction of the flow of current in the loop 5 is clockwise whilst in the loop 6 it is counterclockwise, whereby a substantial neutralization of the fields of the two loops beyond a desired distance, that is outside the cinema, is obtained. Loops 7, 8, 9, and 10 in series with the loops 5 and 6, are arranged in another part of the cinema, for example the ground floor. The transmitting conductor is preferable earthed as shown at 11 to prevent the said conductor from having a potential to earth other than that due to the small a.c. potential across the output terminals of the amplifier. Moreover, the parts of the transmitting conductor that form leads between the amplifier and the loops and between the several groups of loops, should be kept parallel to one another and close together so as not to produce a substantial field in themselves, such leads being, if desired, arranged in conduits in such a manner similar to mains wiring. The amount of power necessary for the satisfactory working will, where there is no outside electrical interference, be determined by the amplification of the receiving apparatus, but it will in practice frequently depend upon the power needed to mask interference by other electrical apparatus.

Figures Two and Three

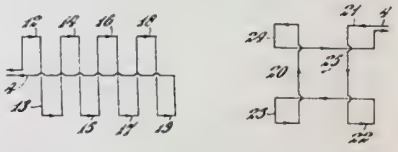
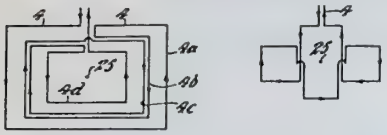


Figure 2 shows a modified arrangement of the loops of a transmitting conductor in which loops 12 to 19 are in series. The loops 12, 14, 16, and 18 have the current flowing therein in a clockwise direction, whilst in the loops 13, 15, 17, and 19 the current flows counterclockwise. The area enclosed by the loops 12, 14, 16, and 18 is made substantially equal to the area enclosed by the loops 13, 15, 17, and 19, for the reason set forth above. In some cases however, the loops, or series of loops forming the transmitting conductor, are arranged in parallel. In this case, to obtain neutralization at a distance, the aggregate of the products of the currents flowing clockwise by the areas enclosed by the loops conducting such currents, must equal the aggregate of the product of the currents flowing counterclockwise by the areas of the loops conducting such currents.

Figure 3 shows an arrangement of transmitting conductor in which the areas enclosed by loops which are in series and in which the current flows respectively clockwise and counterclockwise directions are substantially equal. In this case the transmitting conductor is formed into a large loop 20, in which the direction of flow is clockwise, and loops 21, 22, 23, and 25 in which the direction of flow is counterclockwise, all of the said loops 20 to 24 being in series.

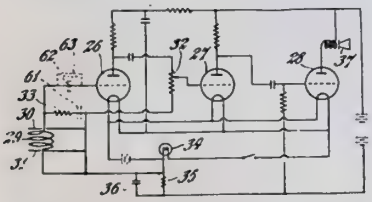
Furthermore, the loops are disposed that the median point or center 25 of loop 20 coincides with the median point or common center about which loops 21 to 24 are arranged.

Figures Four and Five



Figures 4 and 5 show further arrangements of transmitting conductors in the form of loops, arranged in series and presenting the same features as those disclosed in Figure 3. By thus having the loops arranged about a common median point or center, the neutralization of the effects at a distance of the loops is obtained to a further degree than is possible if a series of loops are disposed for example as shown at 7 to 10 in Figure 1 in which the center of the field formed by the loops 7 and 8 does not coincide with the center of the field formed by the loops 9 and 10. As shown in Figure 4, the conductor forms four loops 4a, 4b, 4c, and 4d of which the intermediate loops 4b and 4c have current flowing in the same direction. Thus the field produced between them will be weak and they should be placed close to each other. This arrangement is particularly advantageous where reception is more particularly required at the outer part of an enclosed area as in the case of sports arenas, for example, a football ground, where the central part of the enclosed space is occupied by the players.

Figure Six



As shown in Figure 6 a receiving apparatus suitable for deaf aid purposes may comprise a thermionic amplifier having three thermionic valves 26, 27, and 28. In the input circuit of the grid of the thermionic valve 26 is a pick-up coil 29 which is screened against electrostatic reaction and interference by metallic discs 30 and 31. The screening discs, unless of low conductivity, should be perforated or slotted to reduce induced currents. A potentiometer 32 is used for volume control. It is generally desirable to apply slight bias to the grid of the valve 26 to which the pick-up coil is connected, as otherwise the grid current may cause the impedance of the pick-up circuit to drop sufficiently to alter adversely the frequency response curve of the amplifier. Bias for the first and second stages of amplification is obtained by the voltage drop across an electric flash lamp 34 arranged in the cathode circuit and bias for the output valve 28 is obtained by superimposing on the voltage drop across the electric flash lamp 34, a voltage drop across a resistance 35 which is shunted by a condenser 36. A headphone 37 is arranged in the anode circuit of the thermionic valve 28. With a receiving apparatus as shown, it has been found that decoupling of the high-tension current for the thermionic valve 27 is unnecessary. Instead of applying bias as set forth above, the grid of the valve 26 may be made self-biasing by incorporating in the grid circuit a condenser 62 shunted by a high resistance 63, in which case the electric lamp 34 may in some circumstances be dispensed with.

Figures Seven and Eight

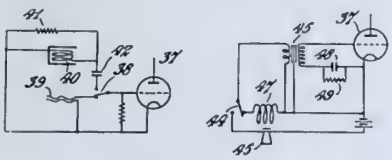


Figure 7 shows diagrammatically an arrangement of deaf aid appliance including a capacity microphone adapted for use as a receiving apparatus in connection with a transmitting apparatus as shown in any of the Figures 1 to 5. By means of a switch 38, a microphone 39 or a suitable screened pick-up coil 40 can be connected to the grid of a valve 37 as desired. The pick-up coil 40 is shunted by a resistance 41, whilst the said coil and resistance are in series with a condenser 42. With this arrangement, the receiving apparatus can be employed for receiving the signals transmitted through a transmitting conductor 4 by connecting the pick-up coil 40 to the grid of the thermionic valve 37, or it may be employed as a normal deaf aid appliance by connecting the microphone to the grid. It is preferable that the condenser 42 shall have a capacity similar to that of the microphone 39 so that when the pick-up coil is connected to the grid, the grid load may be substantially capacitative over all or a substantial part of the frequency range to be received, a condition that is desirable, for example, when negative reaction is applied to the grid for volume or tone control.

Figure 8 shows a further arrangement of receiving apparatus. A switch 44 is adapted to connect the primary winding of a step-up transformer 45 either to a carbon microphone 46 or to a pick-up coil 47 as desired. The secondary winding of the transformer 45 is connected to the grid of the thermionic valve 37 and also to the cathode of the valve through a condenser 48 that is shunted by a resistance 49 whereby bias is acquired by the grid of the valve 37. On account of low impedance of the coil in this case, the screening is generally unnecessary.

Figure Nine

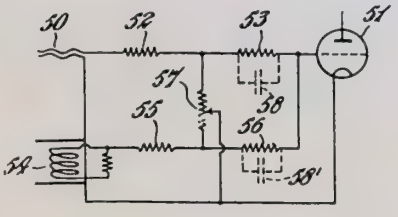


Figure 9 shows a modification of the receiving apparatus in which the microphone and the coil can act simultaneously in variable degrees controlled by a potentiometer 57 on the grid of a thermionic valve 51 respectively through resistances 52 and 53 and through resistances 55 and 56. The resistances 52 and 55 should be of such values that the loads of the microphone 50 and of the pick-up coil 54 are substantially resistive over the range of frequencies to be received whilst resistances 53 and 56 should be of a like value and that of potentiometer 57 somewhat higher. In order to obtain volume and tone control one or more of the resistances 52, 53, 55, and 56 may be made variable or shunted by a condenser to modify the tone. Thus, for example, condensers 58 and 58' may be arranged to shunt respectively the resistances 53 and 56.

Other Details

In order to obtain the most efficient reception, it is usually preferable that the pick-up coil shall be parallel to the plane or planes of adjacent loops forming the transmitting conductor, but, in some cases, as when the receiving apparatus is situated immediately above or below the conductor, reception is very poor or negligible until the pick-up coil is tilted out of parallelism to the plane or planes of the said loops of the transmitting conductor.

Where wire of a light gauge is used for the transmitting conductor, the ohmic resistance of the wire will be large compared with its inductance over the range or part of the range of frequencies to be received and the current flowing in the coil will be substantially independent of frequency. Where the resistance of the transmitting conductor is insufficient in itself, a fixed or variable resistance may be connected in series to render the load resistive over the whole frequency range. Tone control may be effected by varying such resistance. The use of such a resistive load is particularly applicable where no separate output stage is employed but the transmitting conductor is connected in parallel with a resistive load such as loudspeakers. A receiving apparatus as hereinafter described with amplification independent of frequency must be used in conjunction with such a transmitter if a uniform frequency response is required. On the other hand when the transmitting conductor consists of a heavy cable or copper foil its inductive impedance will usually exceed the ohmic resistance thereon over the material range of frequencies. In this case for frequencies at which the inductive impedance of the transmitting conductor is greater than that of the impedance of the output circuit to which it is coupled, the current produced in the transmitting conductor by a given output voltage falls off with rising frequency and tends to become inversely proportional to frequency when the inductance is large compared with the impedance of the said output circuit and the receiving apparatus and pick-up coil may be arranged to have an amplification proportional to frequency. In this latter case, where as uniform frequency resonse as possible is required, the output of the amplifier should be adjusted according

to the impedance of the transmitting conductor at low frequencies—for example, 100 cycles—although in this case a greater power output rating will be necessary to obtain adequate signal volume than where it can be matched at a higher frequency and the loss of bass ignored. In some cases it may be necessary to connect an inductance in series with the transmitting conductor to render the load impedance substantially inductive down to low frequencies. Where a transmitting conductor offering an inductive load is connected to an amplifier that also supplies loudspeakers offering a resistive load, the transmitting conductor may be shunted with a resistance and connected in series with the speakers.

In cases where the output stage of the power amplifier feeding the transmitting conductor comprises one or more pentodes, it is desirable to shunt the output circuit with a resistance shown at 59, Figure 1, thus giving a reflected impedance of the same order as the optimum working impedance of the pentode, or an equivalent effect may be obtained by known methods of negative reaction between the plate or plates or grids of the pentodes.

Where the installation is in a cinema and an independent amplifier or output stage is employed, the input to the amplifier or output stage may be taken from some point in the speech amplifiers of the talking film reproducing equipment. Thus, for example, the input to a low gain amplifier feeding the transmitting conductor may be taken from the low impedance output to a monitor speaker of the talking film reproducing equipment.

It may sometimes be desirable to provide automatic volume compression. This may be done by connecting a metal filament lamp 60 (Figure 1) whose resistance rises considerably with temperature, in series with the transmitting conductor. Under normal circumstances, the current in the transmitting conductor should be sufficient to bring the filament of the lamp 60 intermittently to red heat and its resistance at such a temperature should be of the order to that of the impedance of the transmitting conductor at middle speech frequencies. The effect of the variable resistance will be greatest at the low frequencies for which the impedance of the transmitting conductor is lowest; and this effect may be advantageous as it reduced masking at high sound volumes. Alternatively or additionally any known method of automatic volume control can be applied to the amplifier or its input.

Where the system is installed in a theatre, it is usually desirable to employ an amplifier with a high degree of automatic volume control obtained in any known way and with its input coupled to several microphones in different positions on or near the stage.

At distances outside the loops of the transmitting conductor equal to a few times the diameter or width of the said loops, the induced field will be in most cases weaker than the electrical interference due to power cables which usually exist in towns.

The inductive field will not in general interfere with radio-receiving apparatus or telephones, even if they are situated within the loop. The spread of the field may, however, be reduced by arranging the transmitting circuit to consist of one or more loops with the current flowing clockwise and one or more loops enclosing substantially an equal total area in which the current flows counterclockwise, as shown in Figures 1 through 5.

Where the current in the transmitting conductor is substantially independent of frequency and a uniform response is required, the voltage set up across the pick-up coil is also made independent of frequency. To do this, a resistance 33 (Figure 6) is connected across the pick-up coil or the secondary of a transformer, whose primary is connected to a pick-up coil, such resistance having a value less than the impedance of the pick-up coil or its reflected inductive impedance across the transformer secondary respectively, over the material range of frequencies. The pick-up coil may in some cases be provided with an iron core and be of cylindrical form.

To ensure a reasonably uniform response between 300 and 3,000 cycles, for example, the impedance of the transmitting conductor up to 3,000 cycles must be primarily resistive and not inductive. The resistance of the pick-up coil or the reflected resistance across the secondary of the transformer at 300 cycles must be primarily inductive and be shunted by a fixed resistance at least not greater than this impedance, and the impedance of this coil at 3,000 cycles, which in the case of a coil of a great number of turns, may be largely dependent on its self-capacity, must be not less than the shunting resistance.

Where the ohmic resistance of the pick-up coil may be considerable compared with the inductive impedance thereof at some frequencies within a range for which a linear response is required instead of shunting the coil by a resistance alone it should be shunted by a resistance and a condenser connected in series with one another. Thus a condenser 61 can be connected in series with the resistance 33, Figure 6, the value of the resistance being determined in the same manner as previously and the condenser being of such value that its impedance bears the same ratio to the shunting resistance as the ohmic resistance to the coil does to the inductive impedance of the coil.

If the ohmic resistance of the pick-up coil is considerable compared with its inductive impedance over the entire frequency range concerned, then it should be shunted with a condenser alone of such value that its impedance over the material frequency range is low compared with the resistance of the coil.

It may be found desirable in some cases to increase the effective resistance of the pick-up coil by winding it with resistance wire or by connecting a resistance in series.

Volume and tone control may be obtained by varying the resistance and/or the condenser shunting said coil and/or the resistance in series with the coil, and/or by varying the inductance of the coil by means of tapping or any other known method. Alternatively deviations from linear response may be corrected by any known method of tone correction in the transmitter or receiver irrespective of where they arise.

Where the intensity of the current in the transmitting conductor falls with frequency, a receiving apparatus whose pick-up rises with the frequency should be employed. As in most cases of nerve deafness and in the case of normal hearing at high volumes, a rising response curve is advantageous. A receiving apparatus having this characteristic may sometimes be used with advantage even where the current in the transmitting conductor is substantially independent of frequency.

Such a receiving apparatus may consist of a pick-up coil, whose natural resonance is above the range of speech frequency efficiently reproduced by headphones, coupled to the input of a thermionic amplifier. The sensitivity of the receiving apparatus will increase with the size of the pick-up coil and the number of turns therein, but increasing the size of the number of turns in the coil, in general lowers the frequency of its natural resonance due to its inductance and self-capacity.

For maximum sensitivity the pick-up coil is wound so as to have its natural resonance near the top limit of the frequency range over which a fairly uniform response is required and the coil is shunted by a resistance. This resistance should, at the resonance frequency, be approximately equal to the impedance of a pure inductance whose inductance equals that of the pick-up coil.

The presence of the shunt resistance not only improves the frequency response but greatly reduces any tendency to instability on the part of the receiving apparatus.

Where it is desired to extend the area in which reception of signals may be obtained throughout a town or other desired locality, the transmitting conductor may consist of a telephone, telegraph, or electric power lines already existing or cables installed especially for use in connection with the invention. Radio receiving apparatus, modified by incorporating therein or connecting thereto a suitable pick-up coil connected for example to the gramophone pick-up terminals of the apparatus, can be employed to receive the signals transmitted. In the case of a main set, the pick-up coil should, however, be located at a short distance away from the radio receiving apparatus to reduce interference picked up from the mains transformer or smoothing choke of the set.

In this case the coil may be of larger dimensions than where it is employed with portable apparatus and may be mounted so that it can be turned to obtain maximum pick-up of speech or other sound with minimum pick-up of interference. It may conveniently be of one or a few turns of heavy gauge wire coupled to the set through a suitable step-up transformer. In this case, it will generally be found desirable to earth the primary.

A receiving apparatus according to this invention will also function in stray inductive fields such as exist in proximity to most electromagnetic reproducers such as loudspeakers and the usual communication telephones or their associated transformers.

Gases Produced in Projection Room Fires

Carbon Monoxide, Cyanide, "Nitrous Fumes"
The Real Danger in Film Fire, Not Phosgene

LILLIAN GORDON
Safety Research Institute, Inc.

Whenever theatre fire safety is discussed, projection booth fires receive special emphasis. This is necessary not only because of the highly flammable nature of the materials in the projection booth, but also because a fire in the booth produces conditions somewhat different from fires in other parts of the theatre.

When a material burns, it literally "goes up in smoke," mostly in the form of fire gases. Sometimes these gases are dark, sometimes invisible; they may have unpleasant odors, or be entirely odorless; in any case, they can be deadly. Of the 10,000 persons killed annually in fires, it is estimated that about 2,800 die from "smoke poisoning," often when the body has been untouched by the flames.

While all fires may produce harmful gases, projection booth fires are a special case, because they involve film, lubricants, insulation and other materials which may not be present in the usual fire. In fact, one of the early cases of large-scale smoke poisoning occurred in a film fire. This was the famous Cleveland disaster, in 1929, when the stored x-ray film in a hospital caught fire. One hundred twenty-four persons died, chiefly from the fumes given off by the film.

FIRE-PRODUCED GASES

It was as a result of this fire that research was undertaken to discover exactly what gases are produced when various materials burn. Experimental fires were set in a closed chamber, and the gases produced in this chamber were withdrawn and analyzed chemically. Properties of the gases were noted, and also their effect on the body when inhaled. Tests were run in this way on ordinary combustibles which fall in the class of cellulosic materials (wood, paper, cotton), and also on silk, wool, film, and electrical insulation containing rubber.

Since all of these materials are organic (contain carbon), it was to be expected that a considerable amount of carbon would combine with the oxygen of the air to form carbon dioxide and carbon monoxide. It was found, in fact, that in each case there was rapidly developed an atmosphere which was poor in oxygen and contained toxic concentrations of carbon monoxide. Carbon monoxide is the most dangerous gas usually present in fires, since it is tasteless and odorless, and thus gives no warning of its presence. Also its action is extremely rapid; it can kill in a matter of seconds. It was found, moreover, that, as the amount of oxygen in the air is depleted by the fire, the individual tends to breathe more rapidly, in order to inhale sufficient oxygen. Thus, even a small amount of carbon monoxide in the air can become deadly under such circumstances.

When wood or paper burns there is formed, in addition to carbon dioxide and carbon monoxide, a certain amount of hydrocarbon gases, such as methane, and also some organic acids, such as acetic acid. These acids are quite irritating and may sometimes serve as a safety factor, because of their warning properties. This is also true of certain other products formed by fire, which have unpleasant odors or other effects. To quote a Bureau of Mines circular: "The actual health hazards from a non-odorous or non-irritating gas or vapor of comparatively low toxicity sometimes equal or exceed the hazard from a considerably more toxic substance, but one which possesses a marked odor or produces eye, nose, or throat irritation in advance of harmful exposure."

It is interesting to note that such common materials as wool and silk produce other very deadly gases in addition to carbon monoxide. Silk burns to give hydrogen cyanide (prussic acid); wool produces both hydrogen cyanide and hydrogen sulfide. Rubber also produces hydrogen sulfide. These gases are even more deadly than carbon monoxide, although the unpleasant odor of hydrogen sulfide, resembling rotten eggs, is a protective warning sign.

It may be thought that only very small quantities of these deadly gases are produced in a fire. The fact is, however, that any of these materials burn-

DASHING FOR SAFETY—and a fire extinguisher—is the projectionist's first job when film starts to burn in a projection machine. With the hot gases of combustion rising, the exhaust fan of the booth's ventilation system is left on to draw out as quickly as possible the noxious fumes that are formed. Fast action is demanded because of the fire's speed and to avoid inhaling the combustion gases.



ing indoors, in a space where free entry of fresh air and rapid dissipation of the gases cannot occur, will produce a dangerous atmosphere in a matter of minutes.

When a fire occurs in a poorly ventilated space, the atmosphere rapidly becomes poor in oxygen, so that it may cause simple suffocation. Simultaneously the air is contaminated with deadly amounts of carbon monoxide and of the other poisonous gases mentioned. Fortunately, in many cases the irritating gases produced by burning cellulose and the unpleasant odor of hydrogen sulfide and so forth produced by other burning materials, may force individuals to leave the smoky atmosphere before serious harm is done. However, the presence of carbon monoxide does not become evident except by its harmful effects. This explains why fire fighters are cautioned against inhaling smoke or remaining in an atmosphere where there has been a fire, unless fresh air is available.

PROJECTION BOOTH FIRES

When a fire occurs in a projection booth, in addition to burning wood, rubber insulation, and the like, the major material involved in the fire is film. Nitrate film is particularly hazardous in a fire because it produces "nitrous fumes." These fumes are dark in color, but do not have the safety factor of immediate irritation. Thus it is possible to inhale them deeply. Then, after several hours or longer, the nitric oxide which has been inhaled forms nitric acid, irritating the lungs and frequently resulting in pneumonia. This was the cause of many of the deaths in the Cleveland fire.

Since the projection booth is a rather enclosed space, poorly ventilated, the atmosphere in a fire becomes dangerous in a very short time. This is particularly so because of the speed of film fires. It is for this reason that instructions for fighting projection booth fires always emphasize the importance of attacking the fire from outside the booth.

The rapid extinguishment of the fire is important, not only in preventing the spread of flames, but also in ending the production of fire gases. In this connection, it is appropriate to discuss the extinguishing agent in relationship to the fire gases and smoke, and, in general, its effect on the atmosphere in the booth.

When an extinguishing agent is used on a fire, it may change the atmosphere in the booth. For example, carbon dioxide still further reduces the oxygen content of the air. Vaporizing liquid contributes carbon tetrachloride vapor and other products formed when the vapor strikes the fire. Of course, the contribution of the extinguishing agent to the highly dangerous atmosphere produced by the fire itself is, in proportion, quite negligible. Since safety makes it essential that the fire be fought from outside the booth, the only important consideration is the effectiveness with which the extinguishing agent puts out the fire.

THE "PHOSGENE MENACE"

Because there is a widespread misconception about what happens when vaporizing liquid extinguishers are used on a fire, it may be helpful to clarify the so-called "phosgene menace."

The statement that phosgene is produced when carbon tetrachloride strikes a fire is true only under very special conditions. In the laboratory, with carefully controlled temperatures and with care that interfering substances are absent, small amounts of phosgene may be produced from carbon tetrachloride. But phosgene is very unstable and very quick to combine with other materials. It is decomposed by heat and moisture (or steam), and is absorbed by many inert materials. For example, in a set of experiments designed to produce phosgene by using carbon tetrachloride on a fire in a test chamber, it was necessary to seal the walls of the chamber with a special coating to prevent immediate absorption of the gas.

Such carefully controlled conditions are not present in a projection booth fire. The many other gases present in the atmosphere, and even the walls and equipment, would tend to destroy this highly active gas if any were formed.

In practice, when carbon tetrachloride is used on a fire, the major product formed from the decomposition of the vapor is hydrochloric acid fumes. These fumes are very irritating, and have an unpleasant, acrid odor. By contrast, phosgene has a rather slight odor, similar to musty hay, and the inhalation of small quantities of phosgene does not have an immediately unpleasant effect. Not until several hours after phosgene has been inhaled does it affect the lungs, causing a type of pneumonia similar to that produced by nitrous fumes.

While hydrochloric acid fumes are highly irritating, they are not likely to be harmful. A very small amount will produce an irritating sensation in the throat. It takes about thirty times this small amount of hydrochloric acid to cause any harm. The hydrochloric acid produced by vaporizing liquid when used on a fire may thus be considered a safety factor, since it serves as a forcible reminder that the fire fighter should be outside the booth before he attempts to attack the fire. In this way he will be protected from suffocation as well as poisoning by fire gases.

WITH EXTINGUISHER IN HAND, the booth, where a fire is restricted to the upper magazine, is re-entered with extreme caution—and always keeping the head lower than the fire and, of course, lower than the fumes generated by the fire. Here the projectionist creeps back into the booth, in order to play the contents of the carbon tetrachloride extinguished on the fire in the upper magazine.



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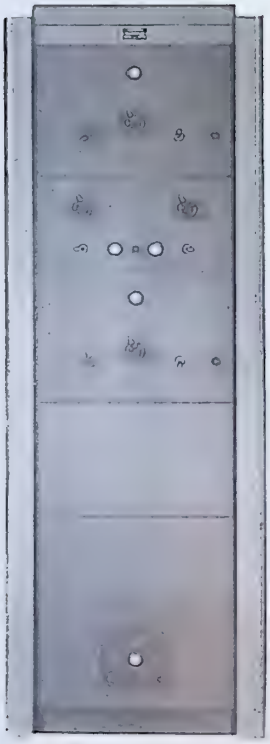
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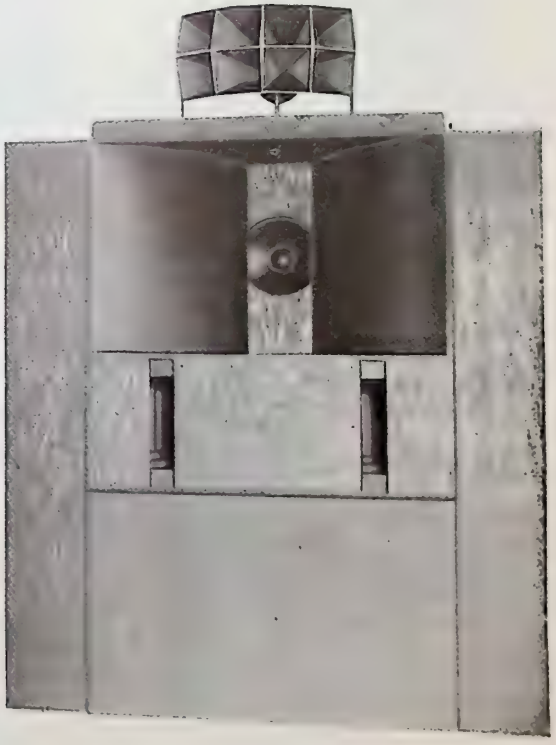


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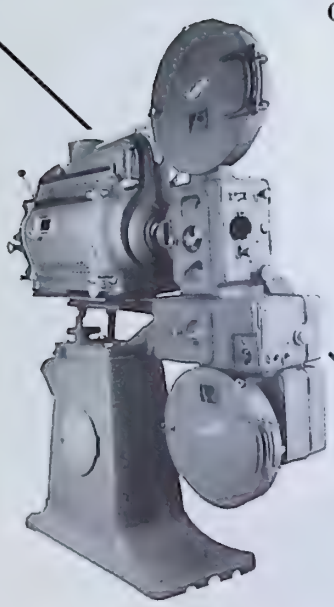
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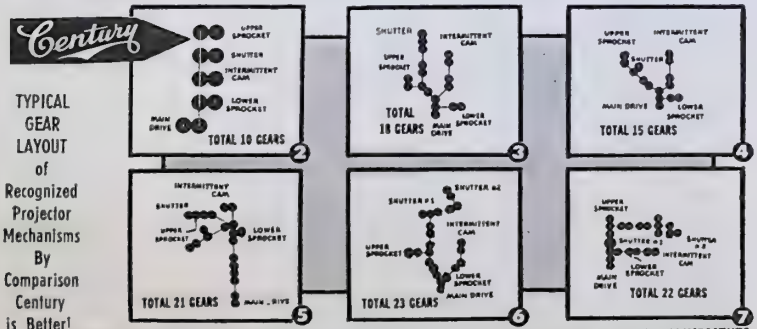


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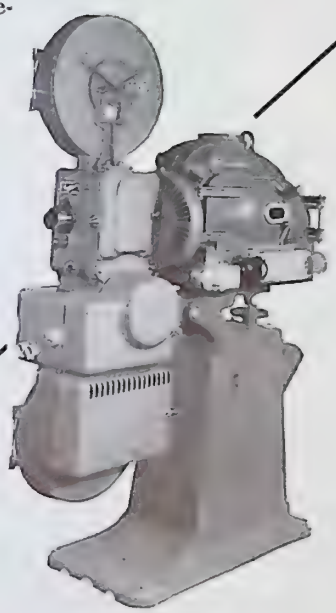


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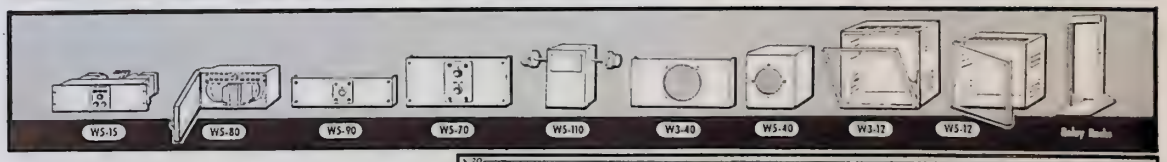
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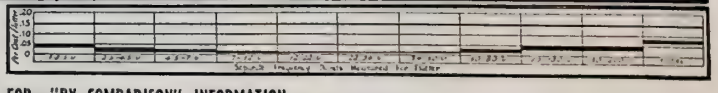
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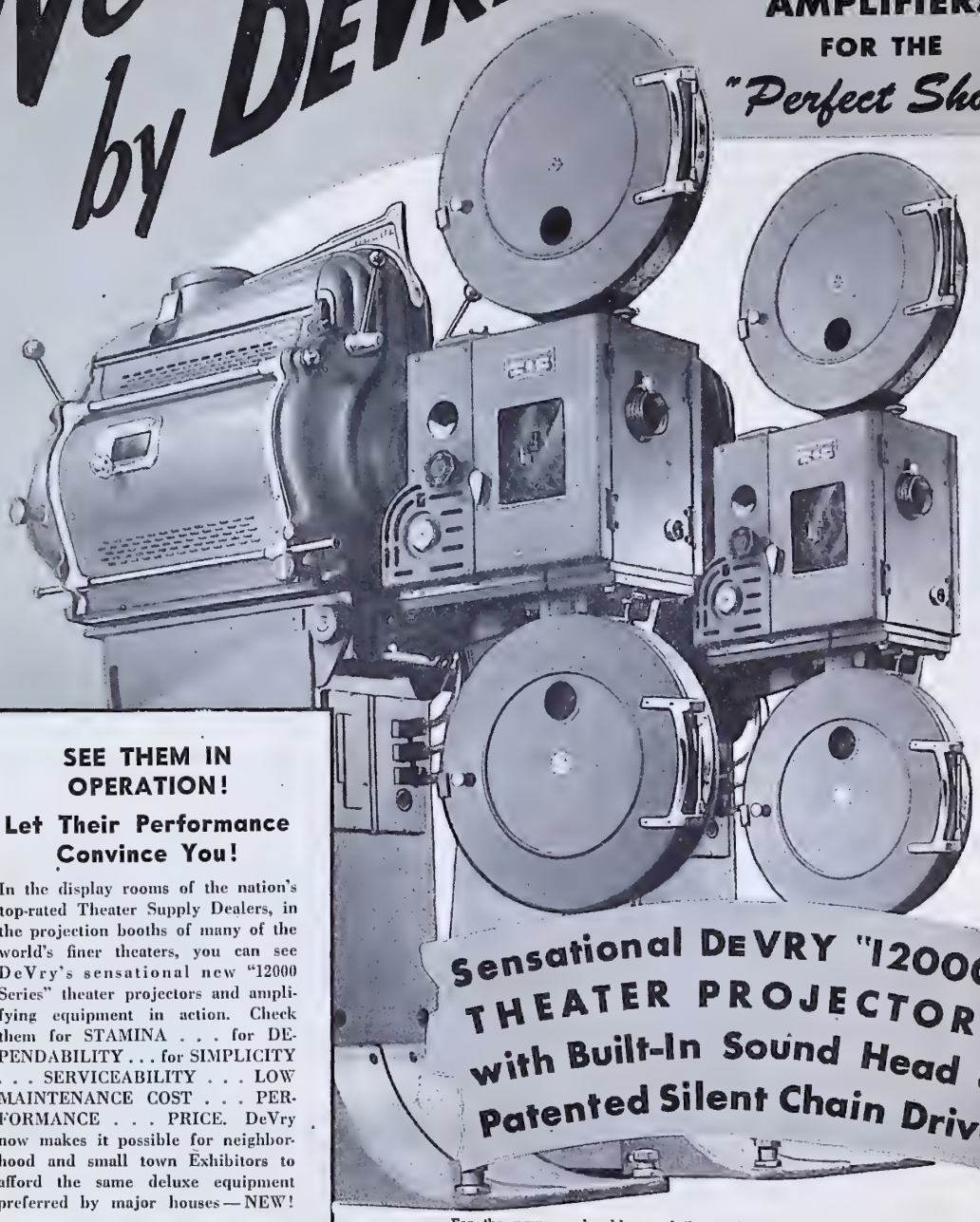


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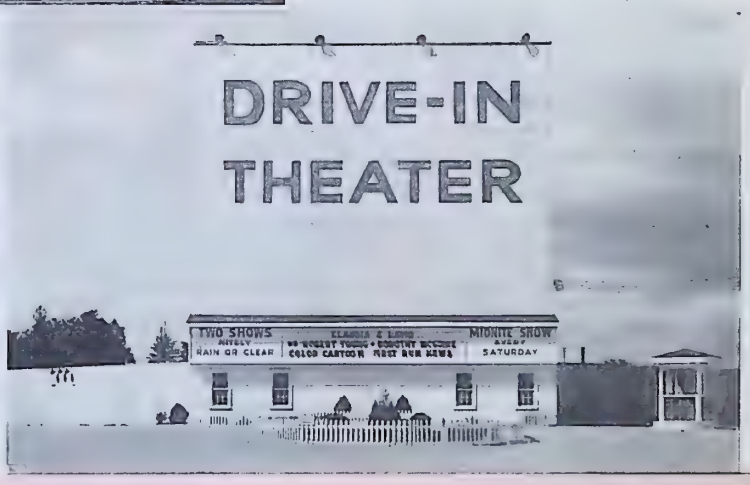


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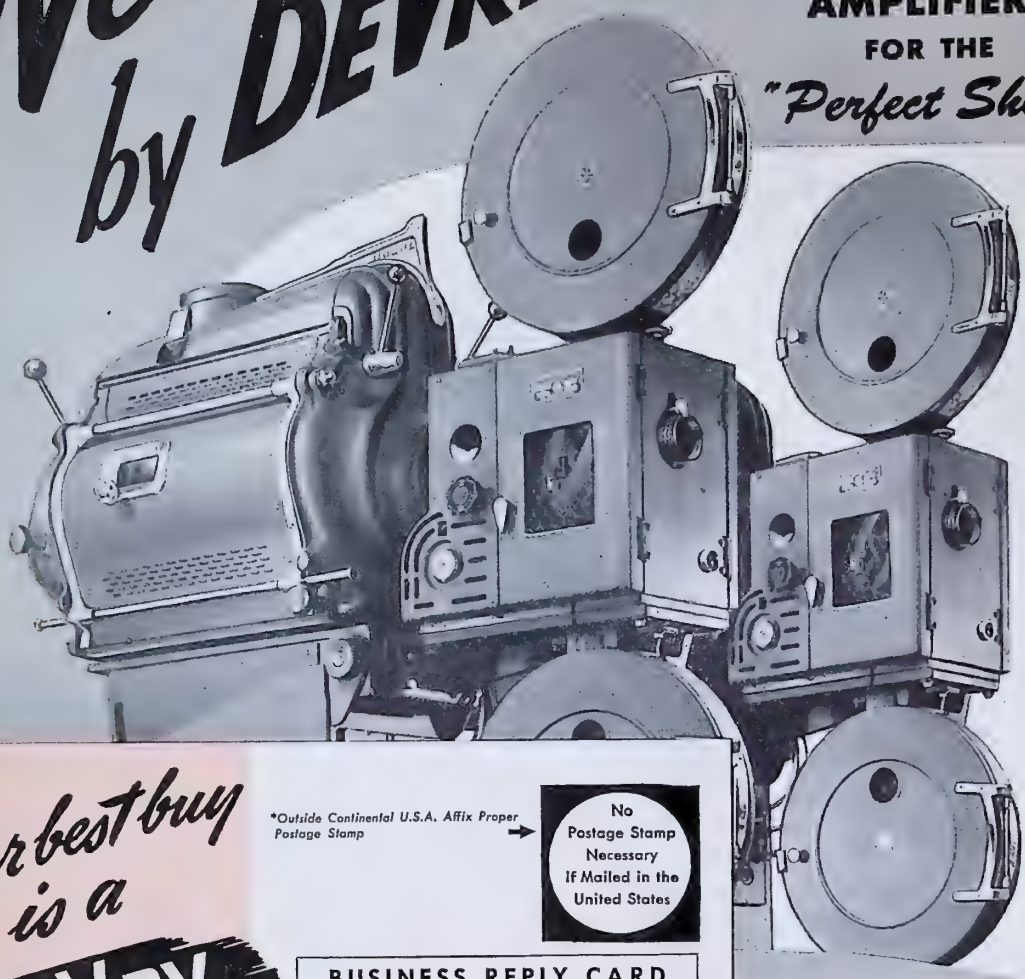
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From coast to coast, Hudson Bay to the Gulf—as well as in practically every country in the world—Projectionists and Exhibitors alike give enthusiastic purchase approval of the new DeVRYS with their many major refinements in design, engineering and manufacture. Also to the fact that DeVRY'S engineered-for-perfect-synchronization "12000 Series" amplifiers are available for every size and type theatre—from 20 to 120 watts and up.

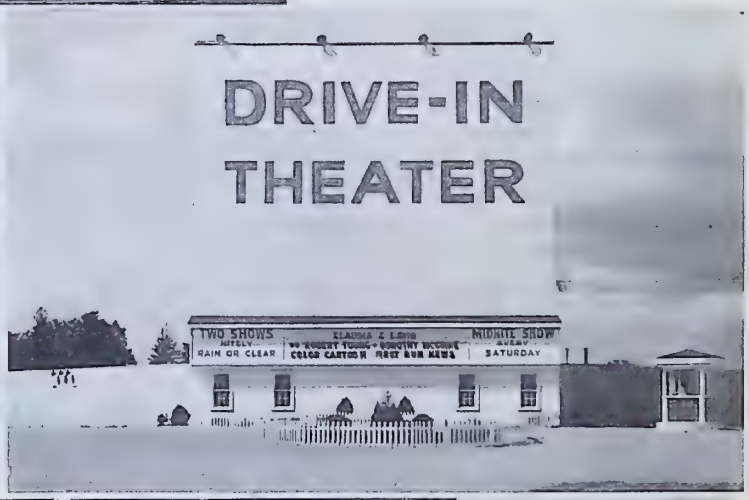


Pictured is the model 15-acre, 850-car capacity PHIL-KRON Drive-In at Bloomington, Illinois, equipped with New DeVRY "12000 Series" projectors, amplifiers and improved DeVRY in-car speakers.

Photographed at Fort Wayne, Indiana DRIVE-IN theatre where new highs in audience satisfaction are being achieved with the aid of DeVRY'S!



NEW DeVRY in-car speakers are compact, lightweight, weather-proof—to withstand long and rugged all-season, trouble-free service. Superb sound reproduction . . . Volume control to patrons' taste.

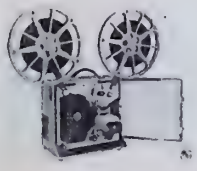


For Theatre Standards in 16mm. Sound Projection, Your Best Buy's DeVRY

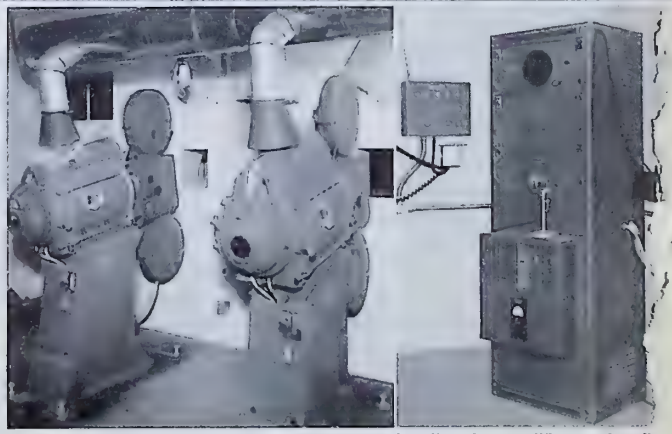


For perfection in 16mm. sound projection you'll want the new DeVRY Portable "11000." An entirely new projector—not just a new model—designed, engineered and built to meet or excel the joint Army-Navy performance specifications for 16mm. sound projectors: SUPER-BRILLIANT PICTURES ACCOMPANIED BY THEATRE-QUALITY SOUND.

The NEW DeVRY "Bantam" Theatre-in-a-Suitcase Today's Greatest Projector Buy!



At the unbelievably low price of $325.00, for personal use—or for church, school, banquet room, conference room or living room—DeVRY now gives you a 16mm. sound-silent projector, amplifier, speaker and screen, all-in-one small compact case weighing less than 31 pounds, and with adequate illumination (750 to 1000 Watts) for projecting brilliant pictures in auditoriums.



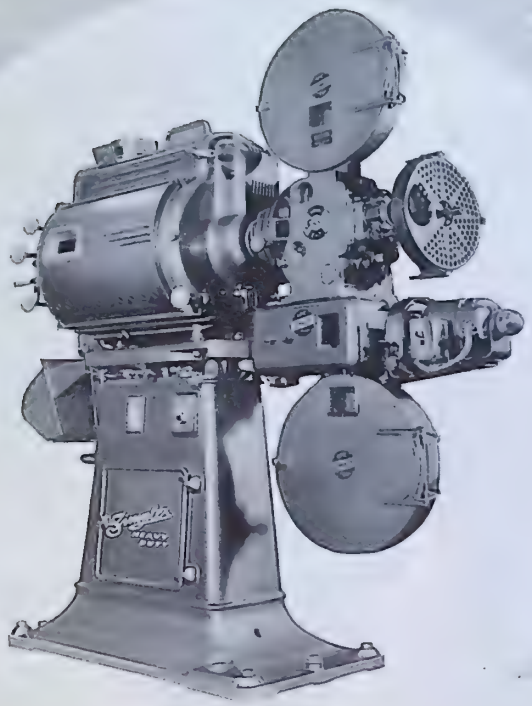
Pictured are DeVRY "12000 Series" projectors and low-distortion amplifiers as install in Fort Wayne's Drive-In Theatre. With sound head and picture mechanism in a complete unit. . . . With patented silent chain drive. . . . With war-proved rotary sou stabilizer and a host of other mechanical, optical and audio refinements, DeVRY "12(Series" theatre projectors and amplifiers deserve the thoughtful consideration of eve one contemplating the purchase of theatre equipment. Remember, too, with DeV "12000 Series" equipment, everything you need to check, service or replace is easy t get to because of DeVRY's Unit Service Plan.

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THE INTERNATIONAL PROJECTOR



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Motiograph offers two basic sound systems—Models M-9-B and M-911 Dual, for theatres of 1,000 and 2,000 seats. The power output of these basic systems may be brought up to serve theatres up to 6,000 seats by the addition of one or more power amplifiers.

With your choice of any model Altec-Lansing "Voice of the Theatre" or Motiograph loudspeaker equipment, Model M-9-B is available with five sizes of loudspeaker systems and Model M-911 Dual with three sizes, while there is choice of three large loudspeaker systems in the higher powered sound system models.

The Motiograph SH-7500 sound reproducer is based on designs of Electrical Research Products Division of Western Electric Company.

Main amplifiers are all power-rated at two per cent distortion. First quality sound reproducers and D.C. excitations are offered in every model. In all dual models two or more main amplifiers are furnished, so that in an emergency sufficient amplifier power is available. Switching panels are furnished to afford facilities for operating either amplifier alone.

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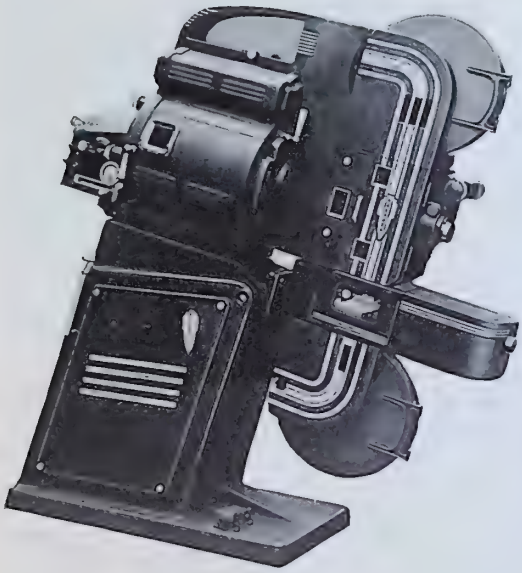
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BRENKERT PROJECTORS—BRENKERT ARC LAMPS



BRENKERT "80" PROJECTOR

A superb projection mechanism in every respect. Costs less in the long run because its long-life construction makes for exceptionally low repair costs. Here are a few of its outstanding technical features:

DOUBLE REAR SHUTTERS: Up to 20% higher picture brilliancy than single shutter projector; clearer, more uniform picture definition; minimum flicker; and minimum heat on film—maximum safety.

RUGGED ENCLOSED DRIVE SYSTEM RUNNING IN BATH OF FILTERED OIL: Added reliability—no bind-ups; long life all running parts; and quieter operation.

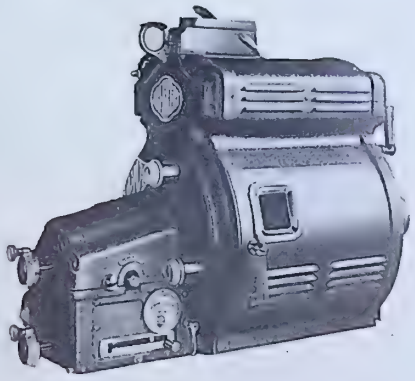
SPECIAL APERTURE COOLING FAN: Keeps aperture temperature at lower, safer level; cannot cause draft through arc lamp, therefore eliminates all need for glass draft-shields.

HEAVY DUTY PRECISION INTERMITTENT: Long life with continual rock-steady projection.

STURDY FILM TRAP CONSTRUCTION WITH PRECISION FILM STABILIZING FEATURES: Makes for maximum picture steadiness for all film conditions; quickly removable construction makes it easy to inspect and clean.

ENARC LAMP

Brenkert Enarc Lamps . . . flood your screen with more snow-white light and . . . fill your theatre with more satisfied patrons. All moving and controlling mechanisms located away from heat and carbon dust . . . operating controls readily accessible from the rear of the machine . . . trouble-free continuous service year in and year out at reduced maintenance and operating costs.



RADARC LAMP

The only high intensity projection arc lamp on the market specifically designed and engineered from top-to-bottom for 1-kw operation on direct current.

The low operating cost of the Brenkert Radarc—more snow-white light on the screen per power dollar spent, plus longer life for carbons—puts this new high intensity lamp within easy financial reach of the medium sized theatre.



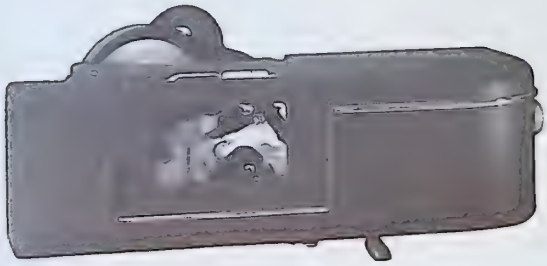
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RCA SOUND EQUIPMENT

FOR EVERY SIZE AND TYPE OF THEATRE



RCA'S FAMOUS ROTARY STABILIZER SOUNDHEAD
The outstanding soundhead in the industry—exceptionally efficient, easy to install, easy to operate, and easy to keep clean and bright.

Over 8000 progressive theatre owners in all parts of the world have turned to RCA for their theatre sound equipment. For RCA's continual forward-looking research and vast engineering facilities have resulted in an outstanding line of equipment, with an unusual record of performance. Be sure you see RCA before you buy any theatre sound equipment.

RCA DRIVE-IN THEATRE EQUIPMENT

FOR BETTER DRIVE-IN "TAKES"

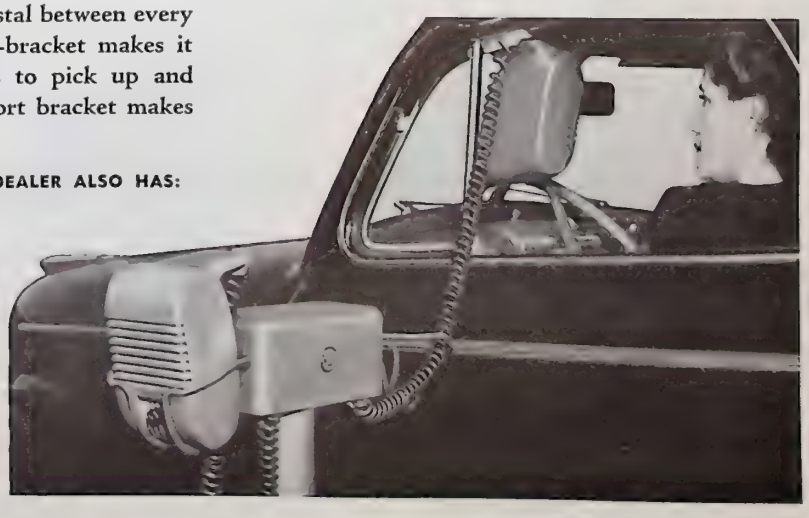
THE RCA IN-CAR SPEAKER permits audiences to enjoy the show with their car windows closed, thus extending the regular operating season many weeks in most localities . . . provides more opportunities to make more money.

RCA'S In-Car Speaker mounts in pairs on a permanent parking-lot pedestal between every two cars. Convenient cradle-bracket makes it easy and handy for patrons to pick up and replace the speaker. A support bracket makes it easy for the patron to attach the speaker to the car window or to any convenient support within the car.

RCA Amplifiers provide true high fidelity amplification, enormous amounts of reserve power and fool-proof standby features.

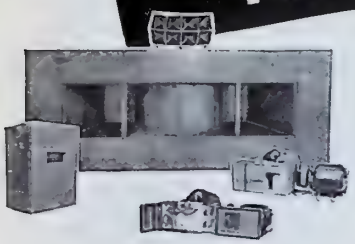
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IN SOUND AND PROJECTION EQUIPMENT



ROYAL SOUNDMASTER COMPLETE SOUND SYSTEMS

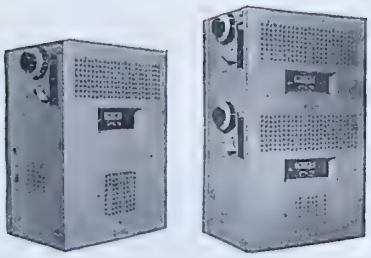
For greater listening pleasure . . . Every sound system includes Royal Soundmaster Soundheads, PD-50 Series Amplifier, and a "Golden Voice of the Silver Screen" Two-Way Horn System.

A size is available to fit the needs of any size theatre. The superb "in person performance" quality of these units is thrilling theatre audiences all over the world.



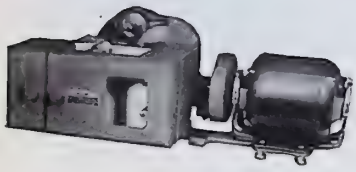
ROYAL SOUNDMASTER TWO-WAY HORN SYSTEMS

For greater listening pleasure . . . seven different models available: No. 7 and No. 11, for theatres seating up to 350; No. 12 for theatres seating up to 450; No. 20 and No. 21, for theatres seating up to 750; No. 30 and 31, for theatres seating up to 1,250. Available individually or in Royal Soundmaster Complete Sound Systems.



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For greater listening pleasure . . . three amplifier series are available: the famous PD-50 single channel, serving thousands of theatres all over the world; the PD-56, a dual channel amplifier (two PD-50's in a single cabinet); and the PD-55 which is a famous PD-50 in a dual cabinet in which another unit can be installed later giving dual channel operation.



ROYAL SOUNDMASTER SOUNDHEADS

Here is the most astounding sound reproducer available today. Three types are offered: (1) for all projectors having simplex type drive, (2) for Powers projectors, (3) the SP model for Powers, ideal for theatres that wish to install new sound using Powers projector mechanisms and later replace them with simplex type mechanisms.



ROYAL SOUNDMASTER BX "DC" EXCITER SUPPLIES

These units are available either for installation in the Soundmaster base, or in a steel cabinet for wall mounting. As with all Ballantyne equipment, these D.C. Exciter Supplies are a top quality item designed for long life and trouble-free performance.



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High Intensity PROJECTION LAMP

The Arc-Master is a 40-65 ampere multi-purpose lamp offering all of the best features of high intensity operation plus many exclusive improvements. No lamp offers so much for so little! Outstanding in performance, flexibility and durability, yet lower in initial cost than any comparable lamp.

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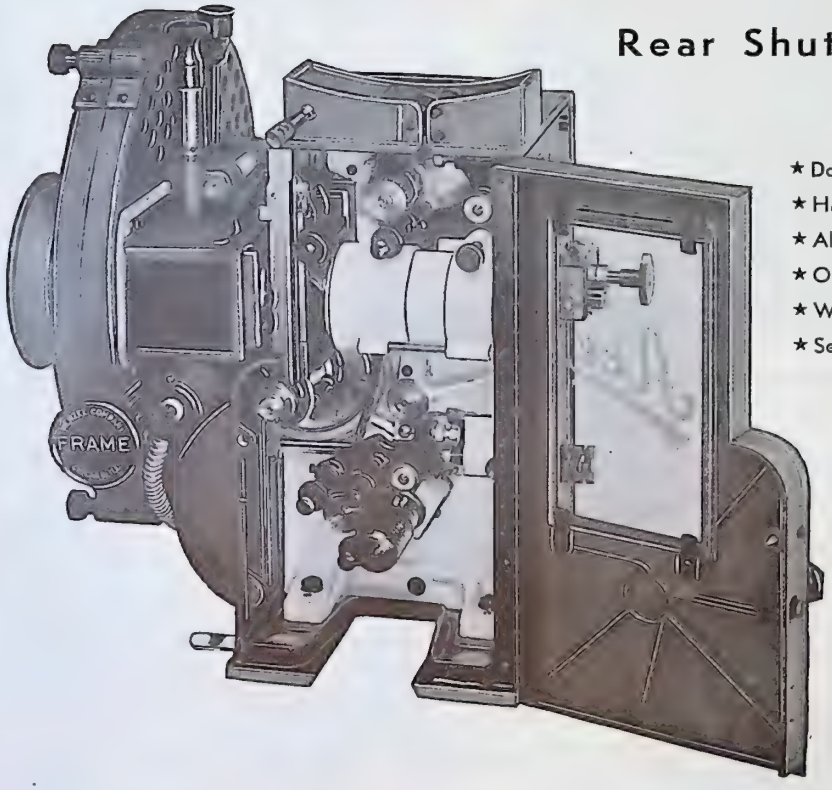
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The Projector of Preference

The WENZEL "ACE" PRO-4

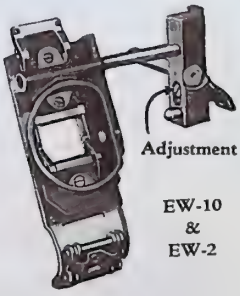
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★ Double-bearing Movement
★ Hardened and Ground Sprockets
★ All Shafts Hardened and Ground
★ One-piece Rear Shutter Bracket
★ Wear-resisting Slip-in Type Gate
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Preferred by exhibitors and projectionists all over the world for its simplicity and economy of operation, and rugged dependability for year after year of trouble-free performance. All parts are carefully inspected and assembled . . . guaranteed to give complete satisfaction as to precision and workmanship. Wenzel's "Ace" Pro-4 projector is the outstanding result of more than a quarter of a century's experience.

Precision-made projectors and replacement parts for various makes of projectors, insure trouble-free, "smooth-running" performance at all times.

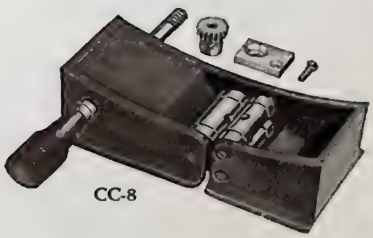


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&
EW-2



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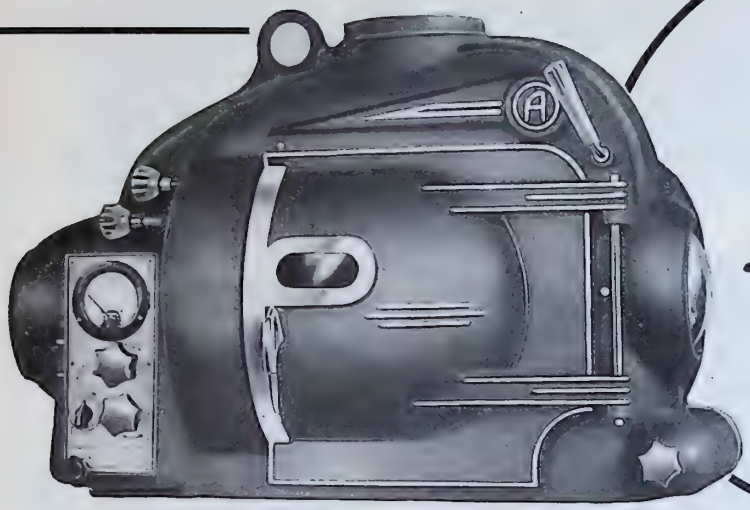
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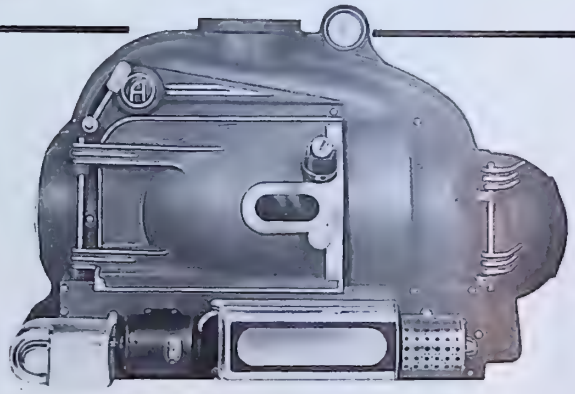
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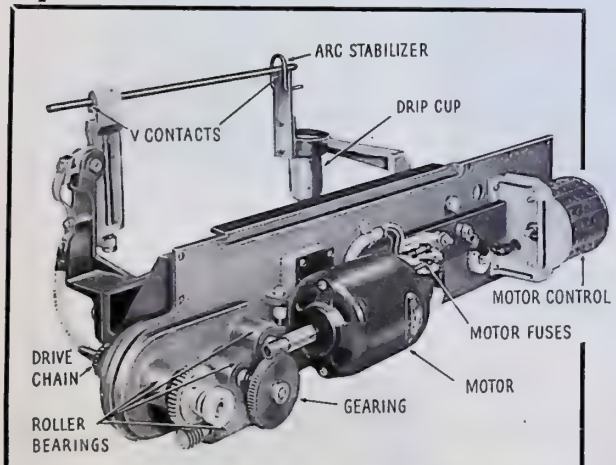
ASHCRAFT *LIGHT* . . . CONSTANT and BRILLIANT

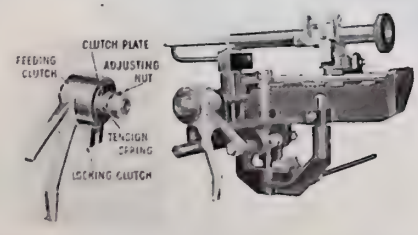


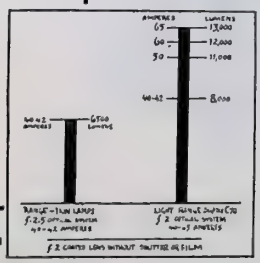
THE New ASHCRAFT Suprex G70

Precision-built projection arc, for theatre screens of any size, employing a wide current range from 40 to 65 amperes, without mechanical or electrical changes.









The *New* ASHCRAFT C-70 Lamp

Many new features have been incorporated into the Suprex C-70. Important to every exhibitor and engineer—that Suprex C-70 is the only full ball and roller bearing projection arc—that the C-70's independent feed, for both carbons, results in precision control and large reserve of light—that unit construction makes all elements easily removable for quick inspection, maintenance or replacement.

Diagram below indicates the maximum light of 1 KW (left in chart). At right, in chart, is shown the large reserve of illumination possible with the Ashcraft Suprex C-70.

Ashcraft Tungar-Type and Copper Oxide

Ashcraft Tungar-type rectifiers are designed for currents from 40 to 50 amperes. The Ashcraft Copper Oxide rectifiers (extreme right rectifier illustration) are highly efficient, trouble-

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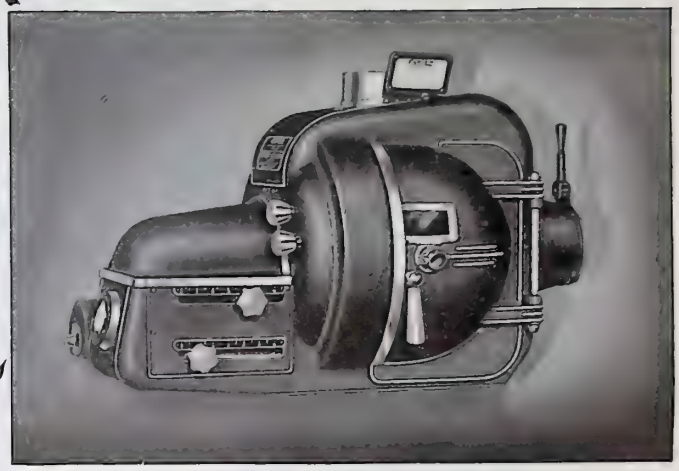
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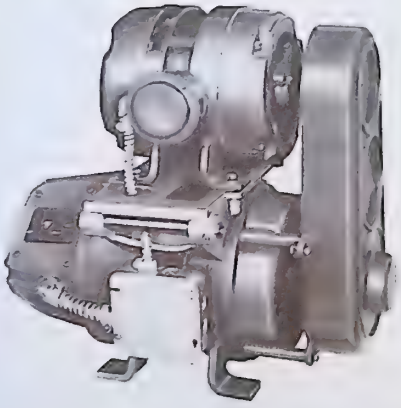
ASHCRAFT Cyclex

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SUPREX "80" LAMPS



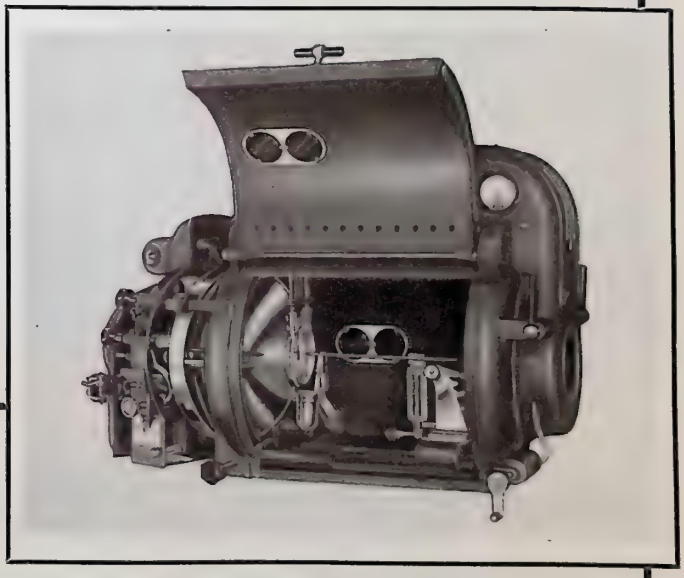


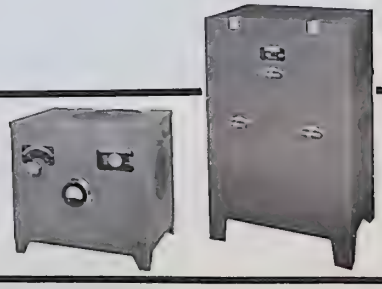
ASHCRAFT CYCLEX—the most economical system of producing brilliant, white screen illumination for medium and small theatres, at minimum operating costs in carbons and current.

ASHCRAFT CYCLEX POWER UNIT—a highly efficient conversion unit which produces AC current at proper frequency for absolutely flickerless Cyclex Projection. Full ball-bearing and trouble-free.

NEW ASHCRAFT SUPREX "80" LAMP

For Drive-In theatres and unusually large screens. The Suprex "80" produces maximum illumination possible with 8 or 9 mm. Suprex carbons. There are many Suprex "80" lamps now in use in drive-in theatres using the larger screens.





Rectifiers

free units capable of 40 to 65 ampere operation.

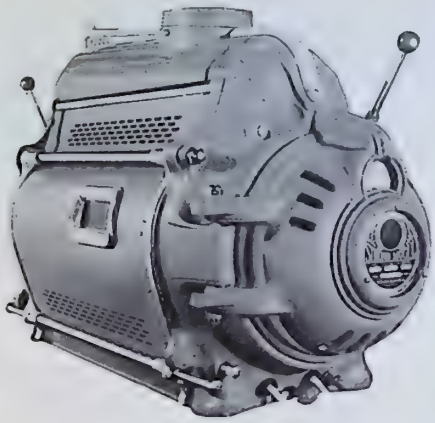
WRITE FOR LITERATURE

CANADIAN DISTRIBUTION—DOMINION SOUND EQUIPMENTS, LTD.

36-32 THIRTY-EIGHTH ST., LONG ISLAND CITY, N. Y.

STRONG
PROJECTION LIGHTING EQUIPMENT

As the Only Projection Arc Lamps Manufactured Complete Within One Factory, Strong Lamps Can Be So Engineered As To Guarantee Best Screen Results



STRONG MOGUL

THE IDEAL PROJECTION ARC LAMP FOR DRIVE-INS AND LARGE THEATRES

projects 15,000 lumens of light—the maximum film will accept without damage—at the lowest possible cost.

Utilizing all the advantages of 70 ampere, 40 volt burning of Suprex carbons, this Mogul projects a brilliant picture on 48-foot and larger screens with all details clearly visible 500 feet or more from the screen.

It is impractical to use more than 15,000 lumens as it would damage the film and no advantage is gained by the use of contraptions for cooling the gate, or glass heat filters, for they absorb practically as much light as they do heat, in addition to being too expensive and complicated for typical theatre applications.

It is furthermore wasteful, as well as futile, to burn more than 70 amperes in any reflector lamp, or twice the current in condenser lamps.

When the lamps are ***STRONG*** *the picture is bright!*

STRONG UTILITY 1KW. HIGH INTENSITY ARC LAMP

A light for the moderate sized theatre using a screen up to 18 feet in width; where the vivid brilliancy of high intensity projection has been heretofore denied by prohibitive operating costs.

To secure the desired screen brilliancy with the present dense black and white films, and satisfactorily present Technicolor films, twice as much light is required as is possible to project by any low intensity lamp. This necessary doubling in light over the low intensity is made possible with this lamp, at an increased combined current and carbon cost of less than 2¢ per hour.



THE STRONG ELECTRIC CORPORATION

The World's Largest Manufacturer of Projection Arc Lamps

87 CITY PARK AVENUE **TOLEDO 2, OHIO**



High Intensity Arc Lamps | One Kilowatt Arc Lamps | Low Intensity Arc Lamps | Portable Arc Lamps | Junior High Arc Lamps for 35 mm. | Junior High Arc Lamps for 16 mm. | Strong two-tube Rectifiers | Delaware two-tube Rectifiers | Four-tube Rectifiers | Six-tube Rectifiers | Copper Oxide Rectifiers | Precision Reflectors

STRONG
PROJECTION LIGHTING EQUIPMENT



STRONG 6-TUBE RECTIFIERS

Designed for use with high intensity arcs to produce exceptionally smooth output current even beyond the normal requirements of the largest theatres.

The maximum operating load is sufficiently below the capacity of the six 15-ampere tubes to result in exceptionally long life. Regularly supplied for use on 220-volt, three-phase, 60-cycle power service. These rectifiers come in three capacities of: 50, 65 and 80 amperes.



STRONG 4-TUBE RECTIFIERS

Built in two capacities, the 4-ampere single-phase for use with the 1 KW. arc lamp, and the 50-ampere three-phase for use with larger high intensity lamps, adjustable from 45 to 50 amperes with 35 volts across the arc.

The 40-ampere single-phase rectifier has the exacting volt-amperage characteristics and smoothing reactance to assure a stable burning 40-ampere, 28-volt arc.

The 50-ampere 3-phase rectifier has been designed especially to supply DC power to high intensity arcs that are adjustable between 45 and 50 amperes with 35 volts across the arc.



STRONG 2-TUBE RECTIFIERS

The best device for converting alternating current line supply to direct current for low intensity arc operation.

Comprised mainly of a special transformer, a radial switch for regulating the current to the desired number of amperes, two rectifier tubes, a substantial housing, and the necessary sockets, lead wires, etc. An efficiency of 75% means a saving in current, which will soon equal the purchase price. Two models, 15-ampere and 30-ampere.



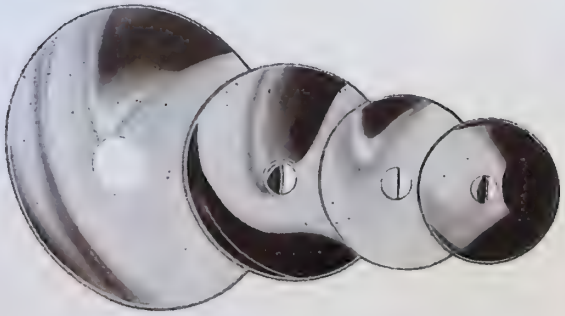
STRONG COPPER OXIDE RECTIFIERS

A rugged, simple and dependable equipment for converting three-phase alternating line supply current to direct current for use with high intensity projection arcs of from 45 to 65 amps capacity.

Transformer taps provide for adjusting the output current over a wide range of amperages and voltage.

Requires no attention or maintenance. There are no moving parts to wear out, make noise or disintegrate.

Built in single lamp units and in two sizes adjustable from 45 to 50 amperes and 45 to 65 amperes.



STRONG REFLECTORS

Since the only light which can reach the screen must be reflected by the mirror, the loss in screen light during the gradual deterioration of a reflector is in direct proportion to the loss in mirror efficiency. Light losses through the use of worn-out reflectors, and amounting to several hundred dollars a year, are not unusual. Endeavoring to make up this light loss through the use of more current similarly represents a pure waste in the form of unwarranted power bills, all of which makes the cost of periodic mirror replacement a good investment.

Strong precision reflectors in a variety of types and sizes for use in all standard projector arc lamps have long been recognized as a dependable standard of quality.

THE STRONG ELECTRIC CORPORATION

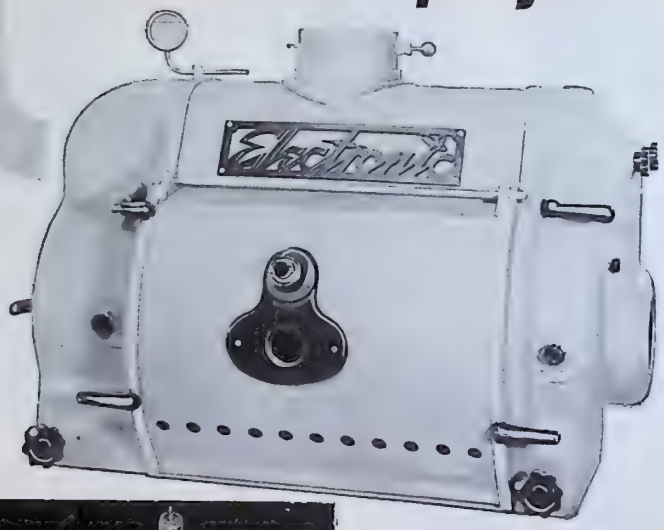
The World's Largest Manufacturer of Projection Arc Lamps

87 CITY PARK AVENUE **TOLEDO 2, OHIO**



High Intensity Arc Lamps | One Kilowatt Arc Lamps | Low Intensity Arc Lamps | Portable Arc Lamps | Junior High Arc Lamps for 35 mm. | Junior High Arc Lamps for 16 mm. | Strong two-tube Rectifiers | Delaware two-tube Rectifiers | Four-tube Rectifiers | Six-tube Rectifiers | Copper Oxide Rectifiers | Precision Reflectors

The New FOREST *Electronic projection lamp*



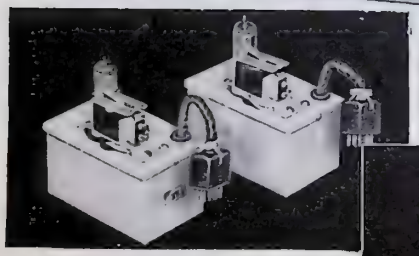
Now Available Quick Delivery

The Forest ELECTRONIC Projection Lamp is in production, available for quick delivery.

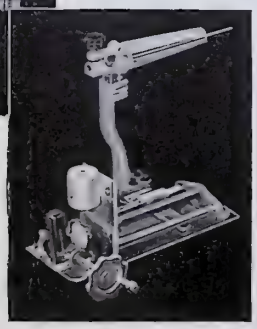
This is the ONLY Electronic Carbon Arc Lamp. It is simple in design, faultless in performance. Carbon feed is controlled electronically. Individual solenoids actuate both positive and negative carbons. A constant gap is maintained, thus making possible maximum brilliance of screen image regardless of the throw.

Unit construction means quick and easy maintenance. Electronic timing of actuating impulses means a steady arc without continual manual adjustment by the operator. Low-cost operation means more profit for the house.

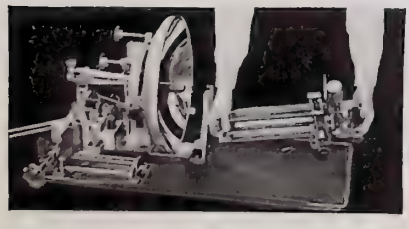
Specify the Forest ELECTRONIC for your next lamp installation.



↑ Electronic Timers control production of actuating impulses. These timing units are replaceable in a matter of seconds.



→ Solenoids actuate individual carbon feed mechanisms. Over 300 parts have been eliminated — no fast moving cams, gears or gadgets to wear out.

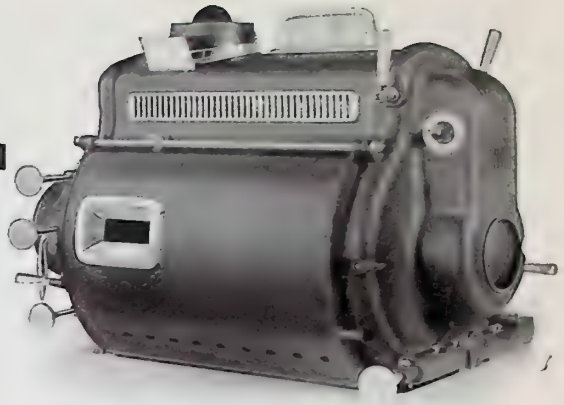


← Unit construction of entire assembly is demonstrated here. Note simplicity of design and ease of maintenance.

FOREST
ELECTRONIC COMPANY INC.
744 Broad St., Newark, N. J.

→ SEE PAGE 377 FOR DATA ON FOREST RECTIFIERS, SOUND SCREENS, RECTIFYING TUBES

Peerless MAGNARC
TRADE MARK REG.



1-K.W. to 70 Amperes

MORE LIGHT—

Ampere for Ampere Up to 70 Amperes,
With 80% Side to Centre Light Distribution
on the Screen, Than Any Other

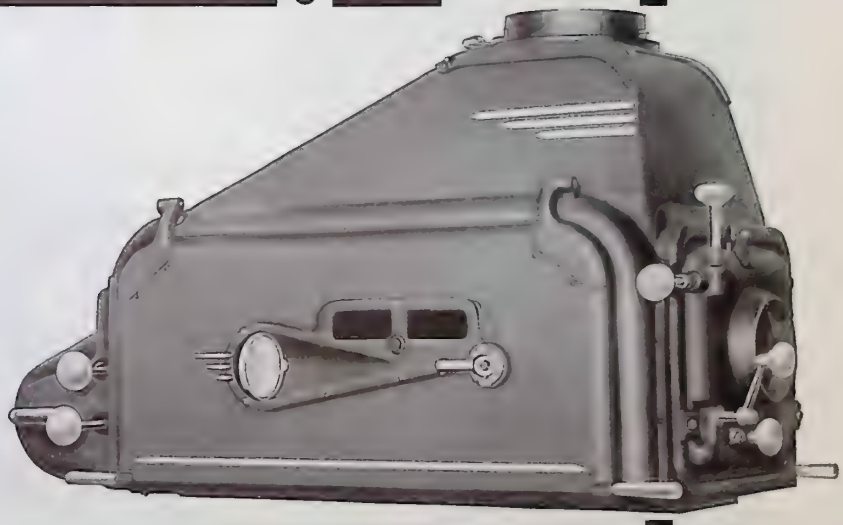
NO HOT CENTRE TO FOOL YOU!

Peerless HY-CANDESCENT ARC LAMP
TRADE MARK REG

120 to 180 Amperes

TWICE THE LIGHT!

The Ultimate Lamp for
All Drive-Ins



"THE FINEST ARC LAMPS EVER MADE"

J.E. McAULEY MFG. CO.
552-554 WEST ADAMS STREET
CHICAGO 6, ILLINOIS

Distributed by

NATIONAL THEATRE SUPPLY
Division of National • Simplex • Bludworth, Inc.

A UNIT OF NATIONAL STANDARD PROJECTION SYSTEM


WITH
Simplex HIGH
PROJECTION
ARC LAMPS
YOUR PICTURES WILL BE
TWICE AS BRIGHT!
Distributed Exclusively by
NATIONAL
THEATRE SUPPLY
Division of National • Simplex • Bludworth, Inc.
"THERE'S A BRANCH NEAR YOU"

the light is BRIGHT *the picture* RIGHT WITH RECT-O-LITE

Rect-O-Lite is made by Baldor, who has specialized in the manufacture of quality electrical equipment since 1920. In designing Rec-O-Lite, our engineers kept foremost in mind that the chief purpose of a theatre is to project a saisfactory picture onto the screen. Accordingly, no effort or cost has been spared in building Rect-O-Lite. Please take note of the substantial net weight of each model listed below. Rect-O-Lite has large transformers to assure reliable operation; large choke coils to obtain a smooth D. C. output; result: a bright, flickerless light on the screen. We list below some of the outstanding features of the Suprex rectifier illustrated at right:

- **Produces brilliant and flickerless light on screen.**
- **Most reliable rectifier on the market. It has no moving parts.**
- **Rectifying elements are the standard fifteen ampere bulbs, which can be replaced quickly, conveniently, and inexpensively.**
- **Saves enough current to pay for itself. Write us for proof.**
- **Does not deteriorate with age. RECT-O-LITE maintains its original high efficiency during its entire life.**
- **Has two 7-point control dials for quick regulation of the arc current.**
- **3 Phase types have voltage terminals of 210, 230, and 250 volts to provide for variation in line voltage.**
- **Backed by Baldor's twenty-seven years' specialized experience.**



GUARANTEED ONE YEAR



LOW INTENSITY RECT-O-LITE

The low intensity Rect-O-Lite delivers 15 to 30 amperes at 50-55 D. C. volts. This result is obtained through the use of transformer and choke coil only—no resistance of any type is used in any Baldor rectifier. The ample use of first grade materials assures reliable operation under all conditions (net weight of 30A Rect-O-Lite 107 lbs.). Thousands of Baldor 30 ampere rectifiers are in daily use giving complete satisfaction.

SPECIFICATIONS RECT-O-LITE MOTION PICTURE RECTIFIERS

Cat. No.	Case	OUTPUT Volts at Arc	OUTPUT Amps. at Arc	INPUT Volts	INPUT Cycles	INPUT Phase	Net Weight	USES
R14	30A	50-55	15-30	115	60	1	107	Low Intensity Arc
R18	45A	27-32	35-45	230	60	1	205	Intermediate Suprex Arc
R20	45T	27-32	35-50	230	60	3	205	Intermediate Suprex Arc Suprex Arc 7 mm. and 6 mm.
R24	60A	31-40	35-60	230	60	1	265	Suprex Arc 7 mm. and 6 mm. Suprex Arc 8 mm. and 7 mm. Spotlight
R26	60T	31-40	35-60	230	60	3		

BALDOR ELECTRIC COMPANY

4357 Duncan Ave. Apparatus Department St. Louis, Mo.

KNEISLEY Presents a Complete Line of *Newly Designed* KNI-TRON Rectifiers



..each with Positive Action Rotary Dial Switch

In the 6 case styles of KNI-TRON Rectifiers shown here you will find a design to fit every motion picture arc application from the Low Intensity Arc to the Suprex Arc. Each is designed to fit a particular arc requirement.

The new streamlined cases, designed with an eye to beauty as well as efficiency, are finished in Gunmetal Hammertex Baked Enamel with Chrome and Red trim. All have rounded corners.

ROTARY TAP SWITCH

All KNI-TRON Rectifiers are equipped with the newly designed Rotary Tap Switch . . . the switch that guarantees complete current control, long life and trouble-free operation. Current regulation is controlled by ONE Bakelite Insulated Handle assuring quick easy operation.

Built for Long Life and High Efficiency, KNI-TRON Rectifiers have no moving parts, no bearings, no brushes to replace.

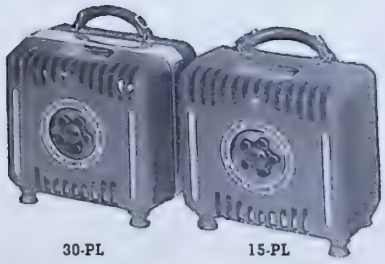


65-TK
80-TK

60-TK
60-AK

40-AK
50-AK

30-AK



30-PL

15-PL

KNI-TRON MASTER PORTABLE RECTIFIERS

have the same built-in high efficiency and long life as our standard rectifiers. Light weight and built to occupy less projection room space, they are also ideal for portable use. Hinged housing provides quick and easy access to all parts. Equipped with positive action dial switch.

COMPLETE SPECIFICATIONS

Ref Number	Type of Rectifier	D.C Amps	D.C Volts	A.C Voltage	Phase	Overall Dimensions	Net Weight Lbs.	Shipping Weight Lbs.	Tubes Req'd.
15-PL1 15-PL2	Master Low Intensity	20	50 to 55	110 or 220	Single	12x12x 9¾	58	73	2- 6 Amp.
30-PL	Master Low Intensity	30	50 to 55	110 220	Single	12x12x11	67	83	2-15 Amp.
30-AK1	Standard Low Intensity	30	50 to 55	110 220	Single	23x12x10½	74	96	2-15 Amp.
40-AK	1KW High Intensity	40 to 42	27 to 28	110 220	Single	23½x12x15½	142	158	4-15 Amp.
50-AK	1KW or 50 Ampere	40 to 50	27 to 36	110 220	Single	23½x12x15½	150	166	4-15 Amp.
60-AK2	High Intensity	56 to 62	32 to 40	220	Single	23½x12x24	196	226	4-15 Amp.
60-TK2	Intermediate High Intensity	40 to 60	27 to 36	220	Three	23½x12x24	176	211	4-15 Amp.
65-TK2	High Intensity	50 to 65	32 to 40	220	Three	23½x12x24	211	245	6-15 Amp
80-TK2	High Intensity	65 to 80	32 to 40	220	Three	23½x12x24	211	245	6-15 Amp.

PROJECTION KNI-TRON EQUIPMENT RECTIFICATION

Every KNI-TRON Rectifier is subjected to rigid inspection and countless efficiency tests before leaving our plant. Every one is guaranteed against defective workmanship or material. Write for complete descriptive literature and prices. Address Department 39.

THE KNEISLEY ELECTRIC COMPANY, Toledo 3, Ohio, U. S. A.

FOREST RECTIFIERS • SCREENS

More Value and More Power for Less Money!

The New Highly Improved Rectifiers

40 TO 75 AMPERES 75-V-6 **40 TO 50 AMPERES 45-V-6**

Single type Six-Tube Rectifiers that achieve a new high rectification efficiency at the lowest possible cost of power, embodying the advanced knowledge gained from building rectifiers for radar and other highly scientific projects where perfection of performance and reliability are of paramount importance. Forest is recognized as the leading manufacturer of power conversion equipment. These new and improved rectifiers are the finest for today's requirements, and also have built into them a reserve capacity to make them easily adaptable for tomorrow's improved carbon which may demand a higher amperage than at present. Designed for all theatres using Suprex or Simplified High Intensity Projection.

- Single-type models designed to save booth space.
- Full 3 Phase Rectification.
- Operates from 3 Phase A.C. Line.
- Built-in Remote Control Relays with Provisions for Operating Spotlights.
- No Moving Parts.
- Power with Flexibility—Constant and Uniformly Smooth Arc Current—No Flicker.
- Quiet Operation—Ease of Operation.
- Standard High Quality Bulbs.
- Sturdily Constructed, All Steel Case.
- Underwriter's Listing.





SUPER MCS

Super MCS RECTIFIER

Forest Super Magnesium-Copper Sulphide Rectifier with the exclusive Forest transformer is internationally recognized for its superiority in every way. It gives definite assurance of protection from line voltage fluctuation. Some of the exclusive Forest features are: reliable 3 phase fan, magnetic switches, automatic voltage regulator — housed in a sturdily built modern design case. Approved by Underwriters Laboratories.

LD-60 Bulb-Type RECTIFIER

LD-60 Bulb-Type Rectifier is acclaimed for its reliability, efficiency, and low cost power conversion device to supply projection arcs. Forest rectifiers conform in every way to the standards required for modern projection. Each rectifier serves one lamp and has an output from 30 to 60 amperes for Simplified High Intensity operation. This rectifier, with the Forest Lamp, meets the demand of the smaller theatre where an inexpensive source of light is required.



LD-60

LD-30 RECTIFIER

Low Intensity Rectifier—a bulb-type rectifier of dependability with ample amperage leeway to insure reserve power. Housed in sturdy all steel case.

RECTIFYING TUBES

For rectifiers, power supply units and battery chargers of all makes. When used in Forest Rectifiers you are assured of maximum efficiency, reliability of operation and maximum economy.

SOUND SCREENS

The special Forest Surface-Processing Method eliminates the necessity of increasing amperage at the arc to obtain increased light on screen. They are all flame-proofed.

FOREST MANUFACTURING CORP. 60 PARK PLACE NEWARK 2, N. J.

→ SEE PAGE 372 FOR FOREST ELECTRONIC PROJECTION ARC LAMP

A *Smoother* SOURCE OF *RECTIFIED* POWER FOR MOTION PICTURE PROJECTION

C and C SIX PHASE ARC LAMP RECTIFIERS

RUGGED METALLIC DISC TYPE . . . NO TUBES USED

- "C&C" SIX-PHASE theatre rectifiers represent an important step forward in motion picture projection. Smoother, more brilliant light results from the SIX-PHASE "FULL-WAVE" RECTIFICATION PRINCIPLE USED. Disturbing flicker is eliminated by delivering 12 impulses per cycle instead of the conventional 6 for ordinary 3-phase full-wave rectifiers.
- These new rectifiers are the result of over 18 years of research and development in electrical rectifiers by McColpin-Christie Corp., Ltd.
- Leading studios, theatre circuits and independents are using these rectifiers. They agree that Six-Phase rectification gives a superior quality of light and represents a highly perfected source of D.C. power for arc lamps.
- "C&C" SIX-PHASE rectifiers are of the rugged metallic disc type, using no tubes. They are available for both small and large theatres. (See table below.) They are simple to install—simple to operate.
- Unusual flexibility of operation through simplified, pre-arranged wiring is obtained by using the TYPE "C" TRANSFER SWITCH for the "H" series and the TYPE "D" TRANSFER PLUG for the "MH" series.
- "C&C" SIX-PHASE rectifiers operate from standard 3-phase A.C. supply line.
- Each model is approved by the Underwriters' Laboratories.



"H" SERIES



TYPE "C" TRANSFER SWITCH



REAR VIEW TYPE MH 2845
Showing Type "D" Transfer Plug which is included in this model.



"MH" SERIES



TYPE 6367
"START-STOP"
SWITCH



TYPE 6805
RELAY



TYPE 6806
TOGGLE SWITCH

RECOMMENDED RECTIFIERS AND ACCESSORIES FOR A COMPLETE INSTALLATION ACCORDING TO CARBON SIZE

TYPE NO.	No. Used Per Pair of Lamps	D. C. Voltage Ranges	D. C. Amps.	Carbon Sizes	Lamp Types	3 Phase A. C. Volts 50/60 Cycles	Recommended Accessories Per Pair of Rectifiers
MH28-45	2	26-30	35-45	6 & 7 m/m	1 K.W.	208/230**	2 #6805 Relays if needed 2 #6806 Toggle Switches for Above
H40-70	2	34-40*	50-70	6 & 7 m/m 7 & 8 m/m	Suprex or Equiv.	208/230**	1 Type "C" Transfer Switch 2 #6367 "Start-Stop" Switches
H55-90	2	Low 34-40 Med. 44-50 Hi. 50-56	50-70 75-90 40-65	6 & 7 m/m 7 & 8 m/m Special Application 5/8" & 5/16"	Suprex or Equiv. ("Spots" ("Effects" ("Stereo."	208/230**	1 Type "C" Transfer Switch 2 #6367 "Start-Stop" Switches
H60-90	2	Low 34-40 Med. 44-50 Hi. 55-60	50-70 75-90 40-75	6 & 7 m/m 7 & 8 m/m Special Application 5/8" & 5/16" 3/4" & 11/32" 7/8" & 11/32"	Suprex or Equiv. ("Spots" ("Effects" ("Stereo."	208/230**	1 Type "C" Transfer Switch 2 #6367 "Start-Stop" Switches

*Low voltage tap with range of 26-30 volts available for 1 KW arc operation at 7% additional cost.
**It is important that A. C. voltage be specified. Can be furnished for other A. C. voltages than those shown.

Manufactured by

McCOLPIN-CHRISTIE CORP., LTD.
LOS ANGELES 37, CALIFORNIA

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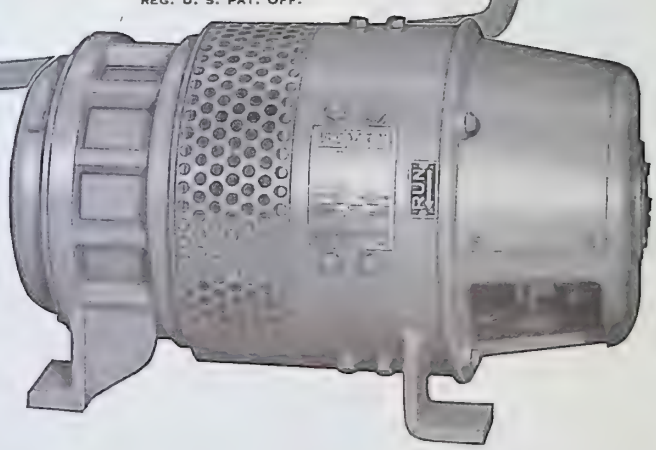
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A UNIT OF NATIONAL STANDARD PROJECTION SYSTEM

Buy Right and you only
Buy Once . . . Buy

TransVerteR

REG. U. S. PAT. OFF.



Ask the man who bought a Transverter 10 or 12 years ago. He'll tell you he bought uninterrupted service and constant screen illumination at low operating cost.

The thousands and thousands of Transverters now in use are your assurance that you can place confidence in the Transverter for every projection arc requirement.

See your nearest National Theatre Supply dealer.

THE HERTNER ELECTRIC COMPANY

Exclusive Manufacturer of the Transverter

A General Precision Equipment Corporation Subsidiary

12600 ELMWOOD AVENUE • CLEVELAND 11, OHIO

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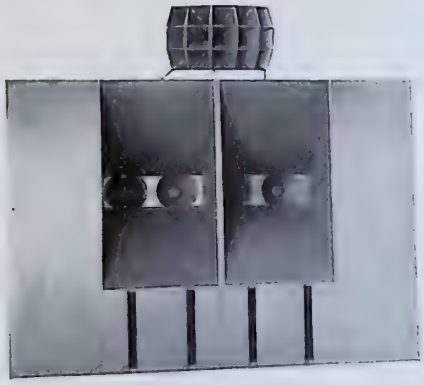
A UNIT OF NATIONAL STANDARD PROJECTION SYSTEM

In Canada: GENERAL THEATRE SUPPLY CO.

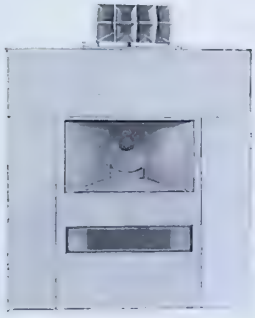
Voice of the Theatre Speaker Systems

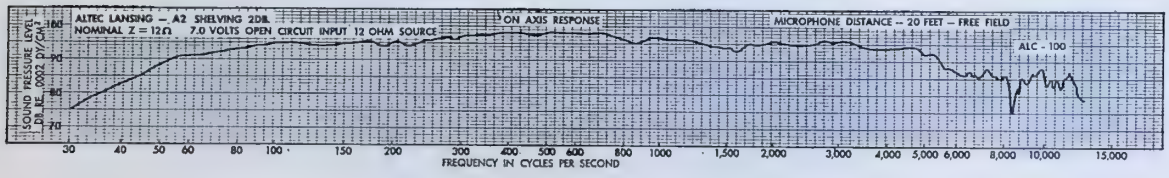
A long term investment to realize the fullest benefits from future developments in sound quality

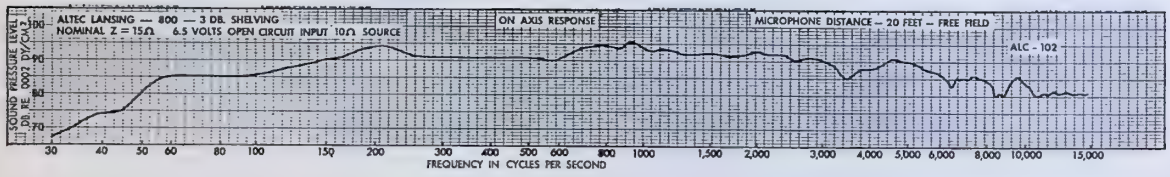
Leading makers of theatre sound systems include Voice of the Theatre as standard equipment



there is a model for every size theatre







Impartial acoustical measurement tests demonstrate the clear superiority of "Voice of the Theatre" over *all* other systems. Note the frequency response curves *above. These response curves have not been equaled by any other make of theatre sound system.*

ADVANTAGES OF VOICE OF THE THEATRE

Live Screen Presence for intimate dialogue.

High Intelligibility for comfortable listening pleasure.

True Bass Reproduction for greater music enjoyment.

Greater Operating Dependability for less management worry.

Smooth Frequency Response covering entire recorded range of frequencies.

High Acoustic Efficiency to prevent distortion from overload of amplifier.

No Backstage Acoustic Trouble to cause boomy male voice.

Durable and Sturdy Construction for dependable service.

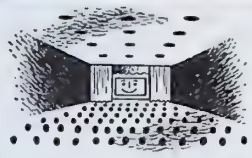
write for name of dealer in your locality

ALTEC
LANSING CORPORATION

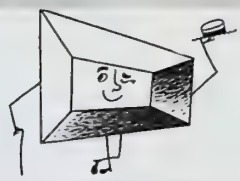
complete technical information on request

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DEDICATED TO THE CONSTANT ADVANCE OF AUDIO QUALITY



Corrects Distortion...
Correct picture vision makes every seat in your theatre a profitable one.



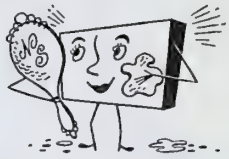
Dimensional Lifelike Picture...
Concave-convex construction gives Nu-Screen an illusion of depth.



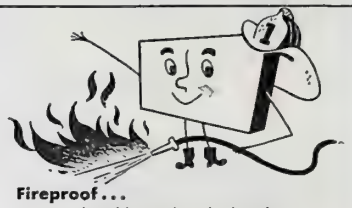
Permanent...
Nu-Screen is long-lasting because it is constructed of durable steel and Fibreglas.



Reduces Screen Cost...
Screen resurfacing and replacing are avoided by using Nu-Screen.



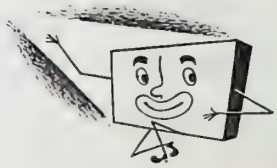
Washable...
Washing with readily available materials restores Nu-Screen to original brilliance.



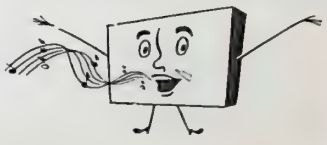
Fireproof...
Non-combustible steel and Fibreglas cannot burn.

Here's your screen for a lifetime...

Top showmen of the country have welcomed Nu-Screen and have capitalized on its exploitation values.



Improves Screen Light...
Curved construction distributes light evenly, reduces glare, increases picture clarity.



Improves Sound...
Porous weave of Fibreglas permits free sound transmission at all frequencies.

Leading theatres of the nation believe that Nu-Screen is the greatest improvement in entertainment since sound. Here are some of the installations:

Universal Pictures Company, Inc.
Winter Garden Theatre, New York, N. Y.
Park Avenue Theatre, New York, N. Y.

Astor Theatre, New York, N. Y.

Syndicate Theatres, Incorporated
Elwood Theatre, Elwood, Ind.
Mode Theatre, Columbus, Ind.

Idle Hour Theatre, Cincinnati, O.

Sidney Lust Theatres
Bethesda Theatre, Bethesda, Md.
Hyatsville Theatre, Hyatsville, Md.
Marlboro Theatre, Marlboro, Md.
Kaywood Theatre, Mt. Ranier, Md.
Rockville Theatre, Rockville, Md.
Cheverly Theatre, Cheverly, Md.

Interstate Circuit, Inc.
Esquire Theatre, Dallas, Tex.
Palace Theatre, Dallas, Tex.

Hollywood Pantages Theatre Corporation
Pantages Theatre, Hollywood, Calif.

Fabian Theatres
Plaza Theatre, Schenectady, N. Y.
St. George Theatre, Staten Island, N. Y.

Lane Theatre, New York, N. Y.

Center Theatre, Bloomfield, N. J.

Town Theatre, Baltimore, Md.

Quimby Theatres, Inc.
Auditorium Theatre, Fort Wayne, Ind.

20th Century Theatre, Buffalo, N. Y.

Dunn Theatre, Dunn, N. C.

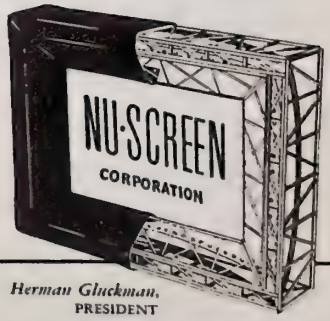
M & P Circuit
Metropolitan Theatre, Boston, Mass.
Circle Theatre, Brighton, Mass.

B & Q Associates, Inc.
Astor Theatre, Boston, Mass.

Butterfield Circuit
Majestic Theatre, Grand Rapids, Mich.

Fanchon & Marco Service Corp.
St. Louis Theatre, St. Louis, Mo.

Send for details about Nu-Screen and see how it can give your patrons greater entertainment value.



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SUPER-LITE—A white vinyl plastic coated material having a light reflection co-efficient of 87+. Entirely diffusive, it will give the same light value for every seat in the theatre. Gives fine detail to the picture and a faithful reproduction of tone and color values. Acoustic tests have conclusively proven SUPER-LITE screen a perfect sound transmitter. Attenuation less than 2 decibles at 8000 cycle frequency.

Inefficient screens result in eye-strain and a loss at the box office, plus—a stepped up current cost in projection.

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- **Length of throw**
- **Width of theatre**
- **Size of screen**
- **Angle of projection**
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This unique construction adds, to the picture, new BRILLIANCE, DEPTH and REALISM. Widespread use by American and Foreign exhibitors since its introduction in 1940 is proof of its practical qualities. The durable molded plastic surface delivers superior projection and sound throughout its long life.

PM—is molded of tough, durable plastic in a continuous surface without seams up to 22'-6" x 34'-0".

PM—sound transmission holes are molded in the shape of smooth flaring horns. The holes are not perforated.

PM—has a surface of tiny curves giving depth to the screen.

PM—plastic surface is hard and smooth which resists dirt and lends itself to quick, effective cleaning.

PM—produces a strong illusion of depth in the picture.

PM—sharply reduces distortion from side seats, improves front seat viewing.

PM—provides clearer sound . . . better high frequency audibility.

PM—performance can be maintained at top efficiency for at least three years by cleaning with Walker P.M. chemical cleaner.

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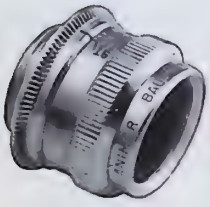
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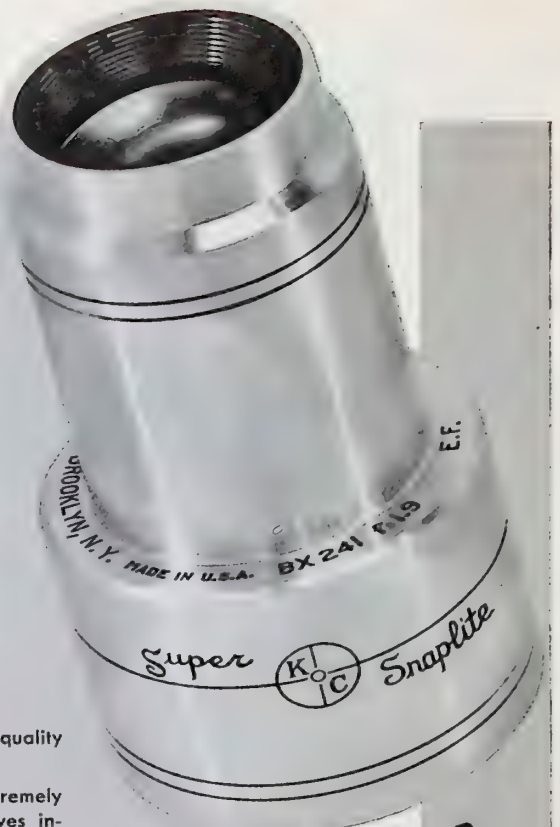
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Focal lengths range from 2" through 5" in ¼" steps. Speed of f/1.9 is maintained throughout. Get the complete details of the new Super-Snaplite by writing for Bulletin 203!

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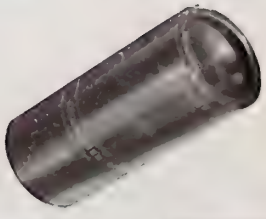


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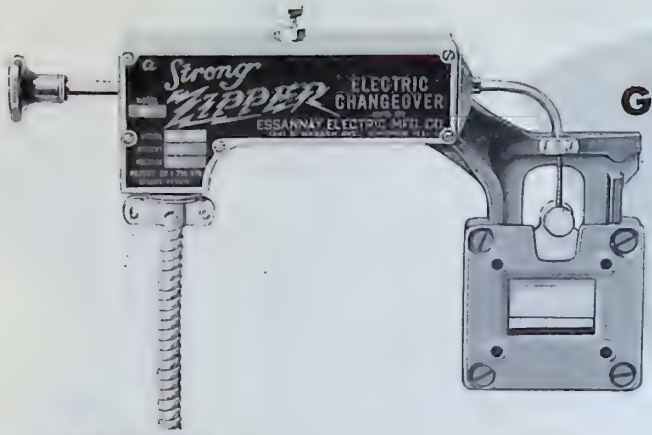
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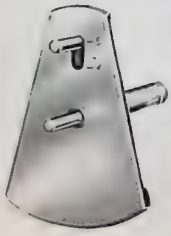
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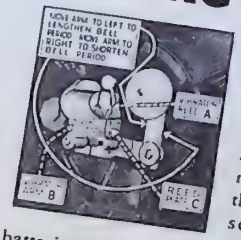
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Simple, rugged, and positively foolproof, the new STRONG REWIND Drive "Mule" fits any enclosed rewind. A flick of the thumb, and it is set to take 4", 5" and Exchange reels.

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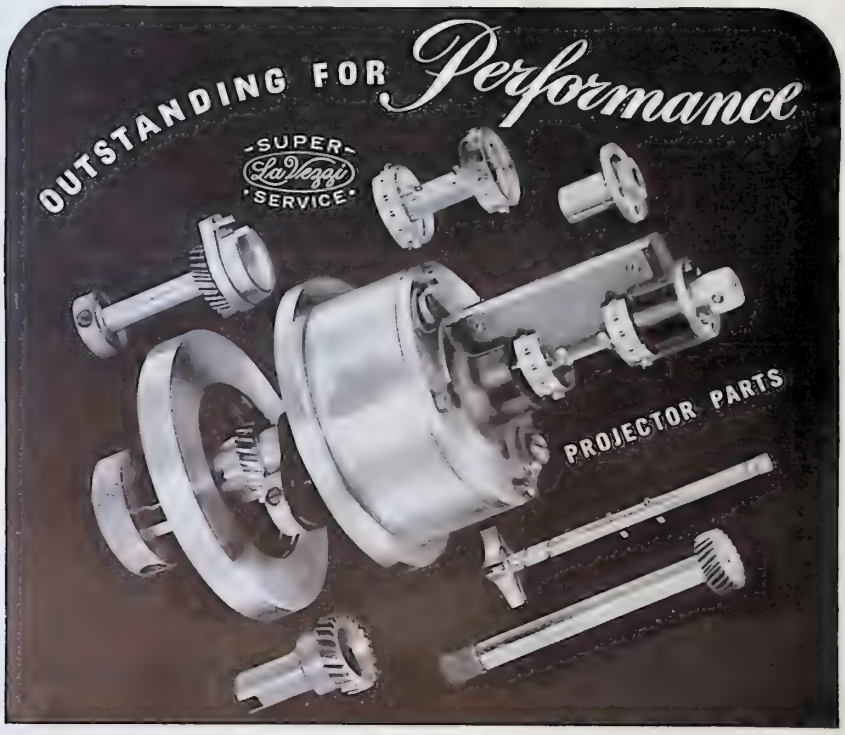
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SCREEN LIGHT AVAILABLE FROM HIGH INTENSITY PROJECTION LAMPS*

Type of Lamp	Type of Carbon	Size	Maximum Recommended Arc Current Amperes	Arc Volts	Maximum Screen Lumens 90° Shutter	Maximum Screen Width with 9 Ft. Lamberts at Center— 75% Screen Reflectivity
Condenser Type	High Intensity, White Flame Positive "Orotip" Cored Negative	13.6 mm x 22 in. ½ x 9 in.	150	78	9750	38.2
	Super High Intensity, White Flame Pos. Heavy Duty "Orotip"	13.6 mm x 22 in. ½ x 9 in.	170	75	10750	40.5
Simplified High Intensity	Suprex Cored Positive Suprex Cored Negative	7 mm x 12 or 14 in. 6 mm x 9 in.	50	37	5000	27.2
	Suprex Cored Positive Suprex Cored Negative	8 mm x 12 or 14 in. 7 mm x 9 in.	70	40	7000	31.6
"One Kilowatt Arc" D.C.	Suprex Cored Positive "Orotip" C. Negative	7 mm x 12 or 14 in. 6 mm x 9 in.	40	27.5	3250	21.9

*(*All data based on use of F/2.0 treated projection lenses*)

The terms "National" and "Orotip" are trade-marks of National Carbon Company, Inc.

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HIGH INTENSITY PROJECTION

The history of screen lighting, even from the beginning, has been one move after another to obtain more and better light. High intensity projection has always produced enthusiastic response from theatre patrons, since they notice and show favorable reaction to the improvement resulting from installation of this type equipment.

High intensity lamps provide a greater volume of screen light than the older low intensity lamps. This allows a clear cut screen image to be shown in the presence of a safe and comfortable level of general illumination. Patrons entering the auditorium from the lobby find their seats without discomfort or embarrassment, while the lighter contrast between the screen and surrounding illumination adds to visual comfort in viewing the picture.

A further advantage of the high intensity arc for projection is the snow white quality of its light. Light from the low intensity arc is comparatively dull and yellowish. This distorts the hues of color features and detracts from the impression of realism which color is designed to create. High intensity projection reproduces all colors with great fidelity and gives a realistic quality to color features not otherwise obtained.

"ONE KILOWATT" ARCS

From the standpoint of the small theatre, the "One Kilowatt," carbon arc ranks among the most important advances in the art of motion picture projection. It enables the smallest theatre, at little or no increase in operating cost, to have the advantages of snow white projection light and the recommended level of illumination on the screen. It removes the edge enjoyed by those theatres having the more expensive types of high intensity lamps.

One of the most important objectives in preparing for future business is improvement in the quality and quantity of screen illumination, especially since increased production in color films is expected. No theatre will be a modern theatre without high intensity projection.

The "One Kilowatt" arc, without increasing operating cost, now allows the small theatre to give its patrons 50 to 80 per cent more screen light, more realistic color reproduction, and a quality of picture presentation unsurpassed by any theatre, regardless of size.

HEATING, VENTILATING *and* AIR CONDITIONING

1947-48

The Packaged Air Conditioner for Theatres

Units Engineered for Unattended Operation Adapted to Utilization in Smaller Cinemas

CHARLES S. CAVE
Airtemp Division, Chrysler Corporation

Fundamentally there are but two methods in popular use for air conditioning a theatre: the centralized system and the "packaged" air conditioners.

Centralized System

The use of centralized systems, employing built-up or tailor-made apparatus and a single large refrigeration compressor, is generally utilized in theatres of 1,000 seats or more.

In this system adequate space for a machine room must be provided, as well as space for a trunk supply-air duct and return-air duct. Overhead distribution of conditioned air is generally employed, with the air introduced to the space by means of decorative ceiling plaques or circular pre-fabricated metal ceiling outlets.

A system of returns from the front or rear or from "mushrooms" under the seats is utilized to return the air to the central air conditioner. Positive introduction of outside air through the conditioner for ventilation purposes is always provided.

Heating is usually accomplished through the same system with the prime source of heat being a steam boiler or community steam.

Figure 1 illustrates the schematic arrangement of the conditioner and supply and return ducts of a large central system. Figure 2 shows a large refrigeration machine which would furnish refrigeration for such a central system.

"Packaged" Air Conditioners

The other method of air-conditioning, which is particularly adaptable to smaller theatres, such as neighborhood houses, employs self-contained "packaged" air conditioners ranging in size from 3 through 25 hp.

These packaged air conditioners contain all of the functional parts of the centralized system in one pre-assembled unit. Only utility connections, a source of steam or hot water, and short air distribution and return systems need be attached to complete an installation.

The air-conditioning layout using packaged air conditioners for a 350-seat theatre is shown in Figure 3. It will be noted that very short supply ducts were required in this case, as space was available for the units adjacent to the conditioned area and the location of the units provided a good air pattern in the theatre.

Figure 4 illustrates the application of several packaged air conditioners to a house seating 828 persons. In this case space was available for the units at each side of the stage. Supply duct work from the units was run at the ceiling on both sides of the house. The foyer was conditioned by a package unit supplying air through ceiling outlets.

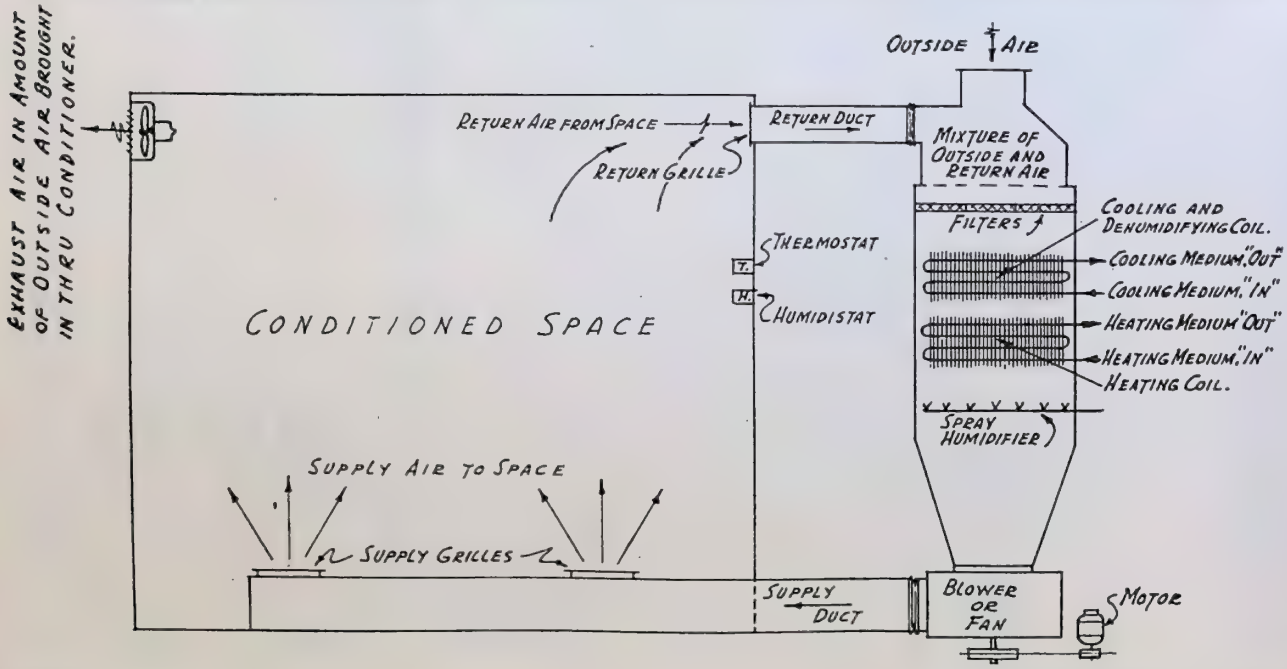
LOAD CONSIDERATIONS

There are many considerations to be taken into account when calculating a theatre air-conditioning load.

From a load standpoint, theatres can be divided into two groups. The first group can be called the "important maximum day-time load" theatres. These are usually the downtown theatres of the larger cities, and are the theatres that have a record or a good prospect of many capacity audiences during summer afternoons. This cooling for these theatres must be figured at the maximum daytime conditions.

The second group of theatres can be called "the evening peak load class." These theatres do not have important summer daytime capacity audiences and hence, their maximum load occurs during the evening hours when the outside wet bulb is below maximum in most localities. This second group of theatres may have Saturday afternoon children's matinees which are well attended but the management can usually discount the discrimination of this audience with regard to comfort. In many localities it has been established that summer Sun-

FIGURE 1—The schematic arrangement of the conditioner and the supply and return ducts of a large central system. From the conditioned space, the returned air is mixed with the proper percentage of outside air, and the mixture is passed through the filters, and thence past the cooling and dehumidifying coil (or, when it is to be used, depending, of course, on what is desired, the heating coil). After passing the spray humidifier, the conditioned air is, by a blower or fan, delivered to the supply duct, through which it passes to the various air outlets in the auditorium and other areas.



day matinees do not draw capacity audiences, even with air-conditioning.

For this second group of theatres, a lower than "maximum summer design" conditions could be used, providing the purchaser understands that the cooling must be started early enough to remove the accumulated heat before the audience arrives and that the system is being designed for capacity audiences under evening conditions (which should be so stipulated in the contract).

It is well to bear in mind that the flexibility of packages permits a theatre owner to install for night load only and at a later date, should the daytime volume of his attendance increase, he can make suitable additions in cooling capacity. These additions to cooling capacity, in the form of additional packages, can be installed for little, if any, cost above that which would result had the additional conditioners been a part of the original installation.

AIR DISTRIBUTION

Another important consideration in arriving at the heat load of a theatre is the method of air distribution. Short runs of duct work that do not pass through the hot attic spaces are the most economical of heat pick-up outside the auditorium. Where the supply duct work does run through the hot attic spaces, a five per cent loss of cold air plus the heat gain through the insulated ducts must be figured as part of the load.

The outside air brought in for ventilation purposes is usually figured in terms of cubic feet per minute (cfm.) per seat. The usual high figure is 5 cfm. per seat and the usual low figure is 3 cfm. per seat.

The use of package conditioners for pre-cooling the outside air not only provides continuous humidity control, but also provides a much higher ventilation rate at less than maximum conditions. Because of this increased ventilation, an installation incorporating outside air pre-cooling by packages on the basis of 3 cfm. a seat will provide as much actual ventilation, on the average, as a conventional installation designed on the basis of 5 cfm. a seat. However, even with outside air pre-cooling by package air conditioners, a design value of less than 2 cfm. a seat is not recommended.

Next in importance to adequate capacity is the matter of a satisfactory noise level. Experience has shown that certain precautions and sound baffling are required to produce a sound level in the nearby seats that will permit a satisfactory audition of the show by the average patron.

BUDGET ESTIMATE

The selection of the proper type of job, load calculation, and layout is a matter for a competent air-conditioning engineer, but, for budget purposes, the following approximate figures on the cost per seat of summer-winter air-conditioning (exclusive of boiler and steam piping) can be used:

Low	$11
Average	$19
Above average	$29

SUMMATION

For the smaller theatre which is being remodeled as well as for new construction, packaged air-conditioning offers

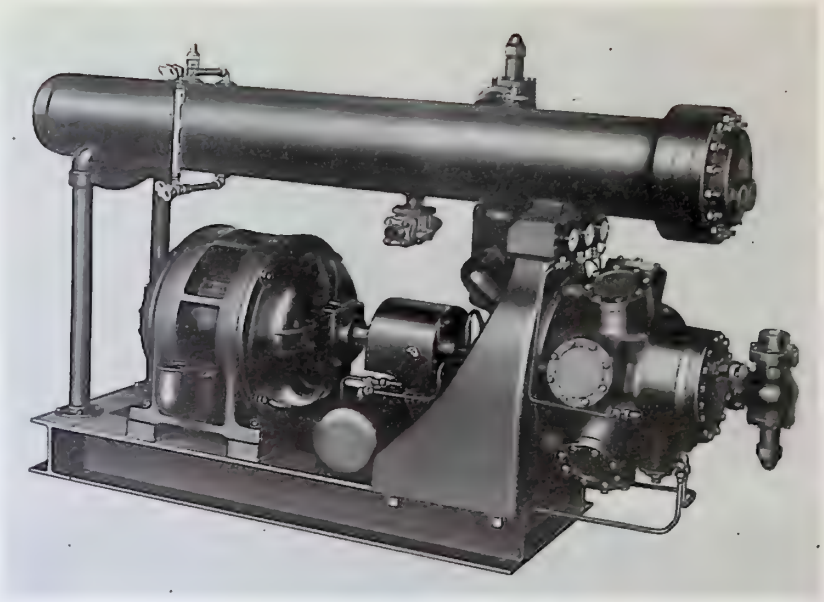
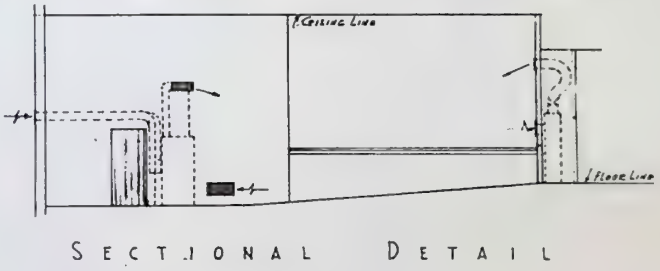
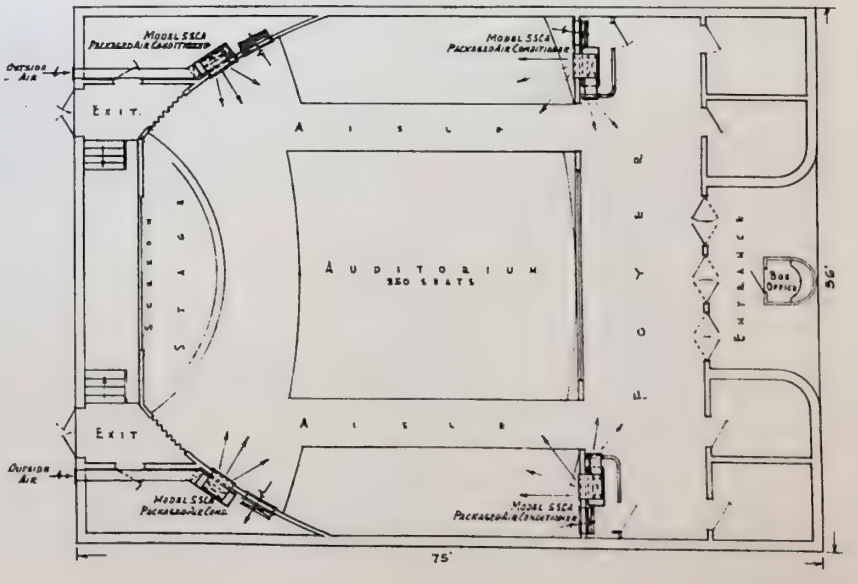


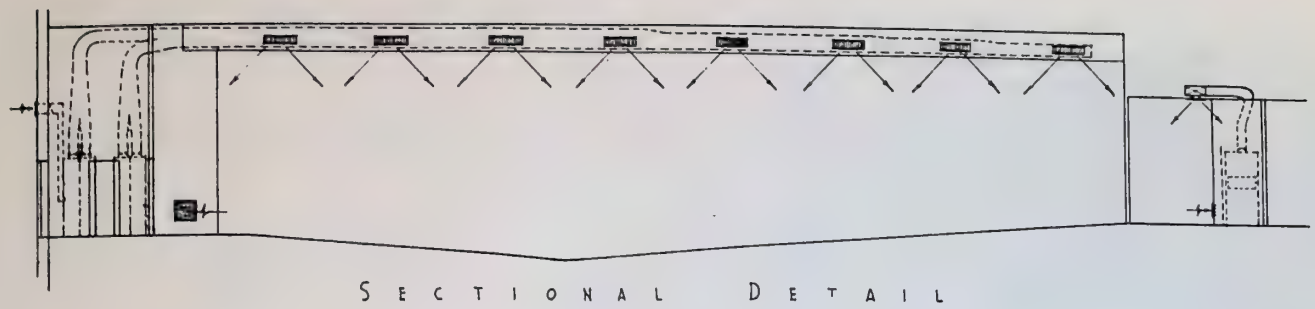
FIGURE 2—A 75-hp. refrigeration compressor, of the type which would furnish refrigeration for a large central system, such as that diagrammatically presented in Figure 1. With this sort of system, a machine room must be provided as well as space for a trunk supply duct and a return duct. Heating is usually accomplished through the same system with the source of heat being usually a steam boiler.

FIGURE 3—Floor plan (with sectional detail) of a 350-seat theatre cooled by packaged air-conditioners. It will be noted that very short supply ducts were required in this case, as space was available for the units adjacent to the conditioned area and the location of the units provided a good air pattern in the theatre. Only utility connections, a source of heat, and duct connections are needed in this case.



SECTIONAL DETAIL





SECTIONAL DETAIL

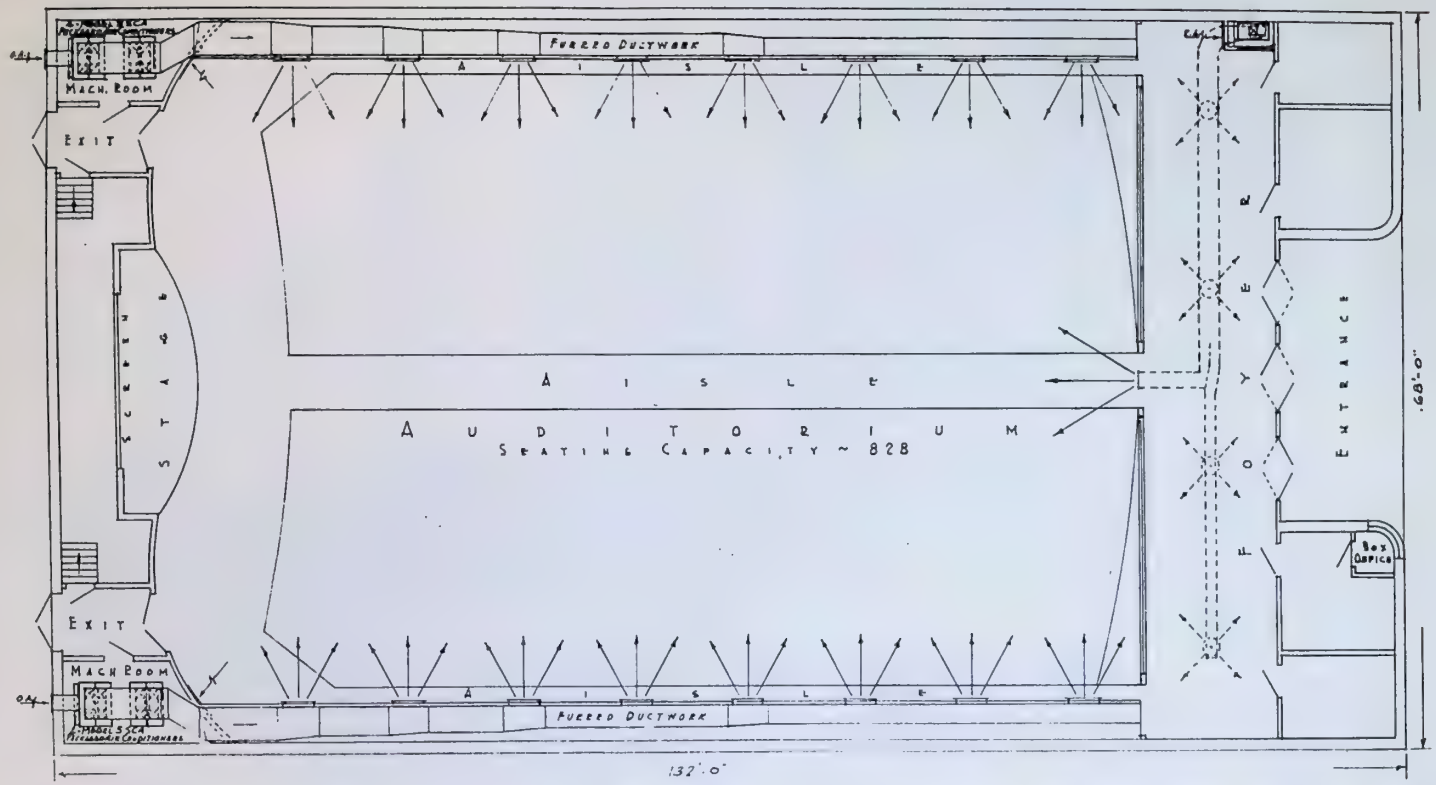


FIGURE 4—Illustration of the application of several packaged air-conditioners to a theatre seating 828 persons. In this case, space was available for the units at each side of the stage. Supply duct work was run at the ceiling on both sides of the house (see sectional detail). The foyer was conditioned by a package unit supplying air through ceiling outlets. It it is well to bear in mind that the flexibility of packages permits a theatre owner to install for night load only and, at a later date, should the daytime volume of attendance increase, he can make suitable additions in cooling capacity. These additions can be installed for little cost above that which would result had the additional conditioners been a part of the original installation. Another important consideration is air distribution in the auditorium proper.



FIGURE 5—A completely self-contained package air-conditioner. Units of this type could be utilized to provide air-conditioning in a smaller theatre, such as, for example, the one diagrammed in Figure 3. These units are easily adapted to theatre use; provide air-conditioning at a reasonable first cost, and at low operating and maintenance costs; are truly automatic, being engineered for unattended operation; provide zoned air-conditioning, with immediate service in that portion of the theatre where it is most needed; and may be installed as easily in either new or existing theatres.

several advantages as follows:

(1) Easily adapted to new and existing theatres with the conditioners located in unused floor areas, as illustrated in Figures 3 and 4.

(2) Provide modern theatre air-conditioning at reasonable first cost, low operating and maintenance cost.

(3) Truly "automatic" theatre air-conditioning with packages designed and manufactured for unattended operation.

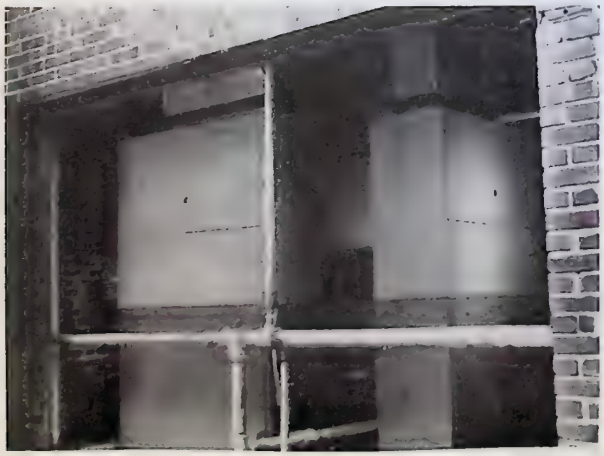
(4) Zoned air-conditioning: The compressor of each packaged air conditioner operates only as the heat load condition in its own area requires. This means only as much horsepower in use as the load requires, which is reflected in operating costs.

(5) Easily and quickly installed in new or existing theatres.

Figure 5 illustrates a completely self-contained package air conditioner such as could be utilized to provide air-conditioning in a smaller theatre.



AS AN EXAMPLE of packaged air-conditioners in actual operation in a theatre, here are several views of the five-unit installation at the Criterion Theatre, Durham, North Carolina. Top picture shows a view of the auditorium. The duct work below the balcony was subsequently sealed in a beam when the installation was completely finished. In the photograph immediately below will be seen the three packaged units installed backstage; and to the right, the picture of the unit installed in an exit way to supply cool, refreshing air to the balcony. Prior to the installation of the packaged units, the 500-seat theatre was heated by a warm air furnace utilizing a blower to provide circulation of air for the comfort of patrons.





Notes on the Use of Unit Air Conditioners

Flexible in Application, Easy to Install

Multiple "Packages" Can Effect Economies

J. F. Dailey

Typhoon Air Conditioning Company, Inc.

Theatre air-conditioning has come a long way since the early days of giant carbon-dioxide central plants. This refrigerant was later discarded for Freon-12, resulting in a more compact compressor. However, this method of distribution, which is maintained at high cost, limits air-conditioning to well patronized theatres with admission prices above the average.

Now a new method, the most modern, using multiple "package type" self-contained units, has arrived, offering all the results obtained with central plants, plus additional advantages.

This new method reduces to total tonnage of refrigeration required, since the self-contained units are situated on the floor of the theatre. The air is then discharged horizontally at a low level, just high enough to clear the heads of the patrons; therefore, no refrigeration is wasted mixing with high-temperature air at or near the ceiling. Cold air, being heavier, will lay at the lowest strata, at the breathing level, avoiding mixture with higher-temperature air above. In this way, a saving of as much as 25 percent refrigeration can be realized. This 25 percent will be reflected in saving in machinery, water consumption, and motor horsepower.

Self-contained unit are compact, of good appearance, and they can be located in full view if desired. Then, too, air ducts are not necessary, as the units are provided with directional flow grilles on the front or back and additional grilles also placed on the sides.

Self-contained units are very flexible in application. They are easy to install and the only hookup required is electrical connections to the factory-engineered control panel within the unit. Then connect plumbing piping to the water supply and drain lines. Presto! Your air-conditioning is ready to operate and give perfect air-conditioning comfort. In addition, thermostatic zone control is obtained, assuring even temperature over the entire theatre.

Those in the know are well acquainted with the difficulties met to obtain this zone-control feature when employing the

EXTERIOR VIEW of the "package type" self-contained air-conditioning manufactured by the Typhoon Air Conditioning Company, Inc. Such units offer the same results obtained with central plants, plus additional advantages such as that of using as many of the units as the conditions require.

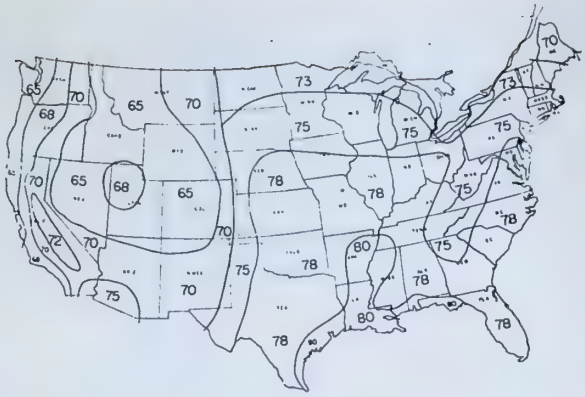


INTERIOR VIEW of the same Typhoon air-conditioning unit. Such units are easy to install and the only hookup required is electrical connections to the factory-engineered control panel within the unit. Plumbing piping is also quickly connected to the water supply and the drainage lines.





AVERAGE DRY-BULB TEMPERATURES in the United States, calculated as a basis for estimating the cooling requirements of theatres. This map, and its figures, should be used in conjunction with the adjacent map that shows comparable averages for wet-bulb temperatures throughout the country.



AVERAGE WET-BULB TEMPERATURES in the United States, calculated as a basis for estimating the cooling requirements of theatres. This map, and its figures, should be used in conjunction with the adjacent map that shows comparable averages for dry-bulb temperatures throughout the country.

central-plant system and the extra expense encountered.

Table 1 is an approximation of the tonnage required in theatres for different sections of the United States, based on average dry- and wet-bulb temperatures.

Type of construction, insulation, and orientation will, of course, influence the size of unit required. The very nature of a fully occupied theatre produces a high latent heat and to dissipate this requires units equipped with over-size cooling coils. It is important, therefore, that units be selected with cooling coils of full face area and five to seven rows deep.

Where water is scarce or expensive, cooling towers should be used for water conservation and economy. However, here, too, units should be selected with special three-pass condensers for more efficiency and capacity, units with standard condensers are designed for city water supply and cannot do the same job for use with cooling towers.

Self-contained units are especially adapted to small theatres and locations favored at the stage end and entrance end. However, they are not limited to small theatres. In several large theatres, as many as twelve units have been recommended with certain good results and at lower cost, plus the added feature of zone control.

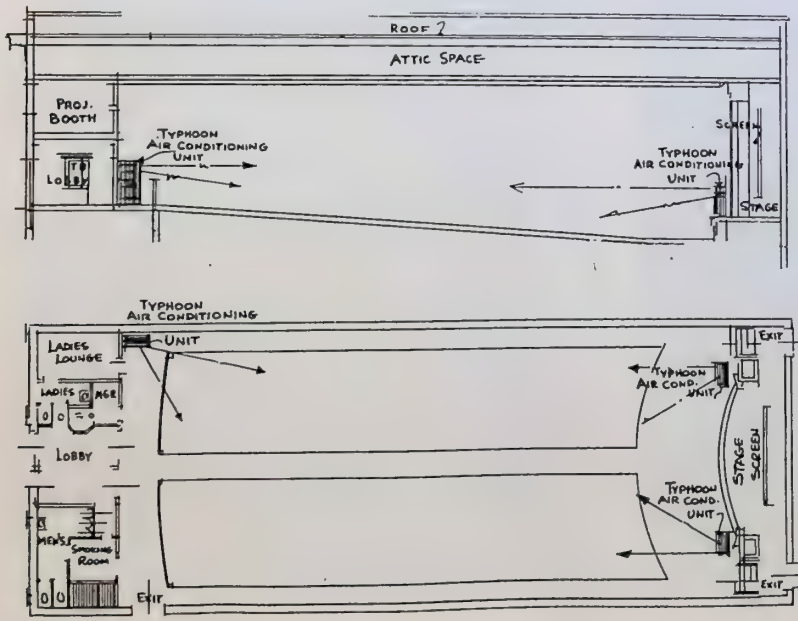
Theatre owners should also have in mind a maximum risk of central plant being shut down for want of replacement of a critical defective part, as experienced during the war period, versus the minimum risk of all the self-containeds being out of commission at the same time.

It must be agreed that self-contained units can be moved from one theatre to another, without such loss encountered when removing a central system.

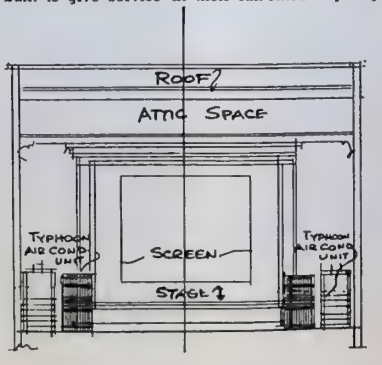
Winter heating with the self-contained units is accomplished by simple connections to factory heating coils. This feature eliminates the necessity of unsightly wall radiation or any direct radiation in the theatre, other than that required for toilets, lobby, or stage.

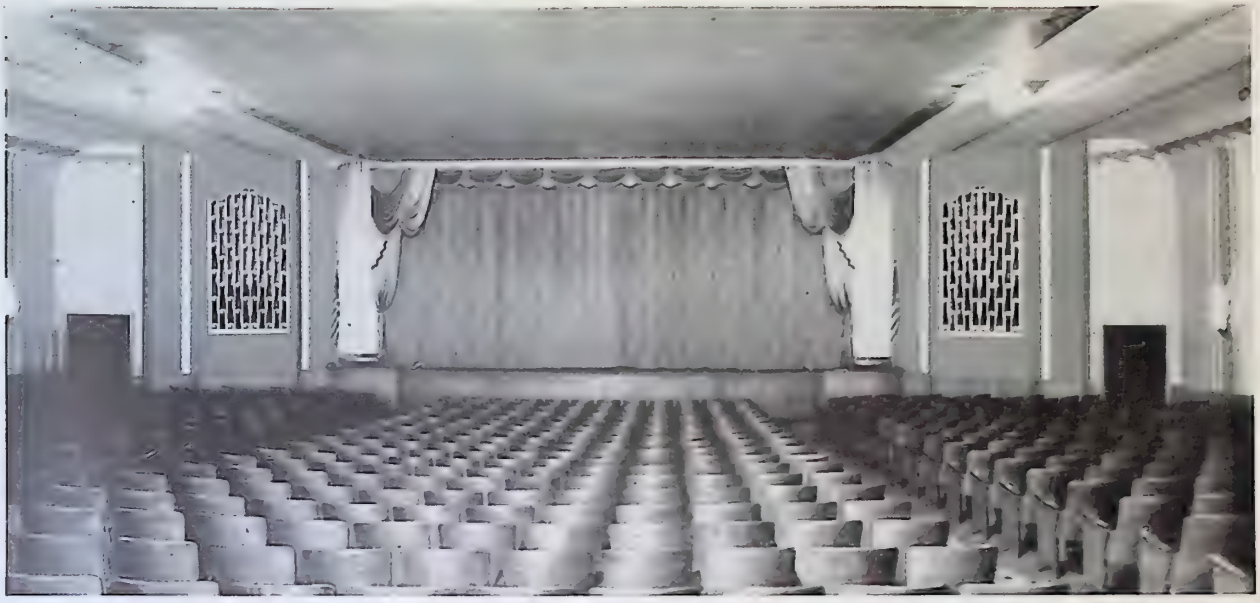
TABLE 1—Seats per ton of refrigeration for various design conditions. (These figures can be modified somewhat for cases where the maximum occupancy takes place during the evening when the fresh-air load and transmission load is small.)

Wet bulb (° F.)	Seats per ton, with dry bulb at— 90° F.	95° F.	100° F.
65	25	24	23
70	24	22	22
73	22	21	21
75	21	20	20
78	20	19	18



SUGGESTED ARRANGEMENT of Typhoon self-contained units in a typical one-floor theatre to provide satisfactory air-conditioning. The upper left drawing shows this typical theatre in longitudinal section, with the orchestra plan shown at the lower left. Immediately below is shown the transverse section. In this layout three units are used: one at either side of the screen and the third at the rear right of the auditorium. In the unit set-up, one, two, or three may be operated as the conditions demand. The self-contained units are suited for air-conditioning and heating the small and Quonset theatres with seating capacities up to 600 seats. The same units cool, filter, dehumidify, and circulate the air in summer, and heat in winter. The large coils, condensers, and other over-size parts are built to give service at their full-rated capacity.





AN EXAMPLE OF THE INSTALLATION of self-contained "package" air-conditioning units is shown in these pictures. From the size of the auditorium—and the locale of the theatre—four units were deemed required for satisfactory air-conditioning: two units at the front of the auditorium and two units in the rear. The usual placement of the units would have set one on either side of the screen, and actually such was done in this instance, even though the units are not apparent (top picture). Since this theat.e antedates the sound-pictures era, an organ had been installed in the early days, and the masked organ pipes still installed. So the engineers decided to take advantage of the natural masking available, and they proceeded to remove the old organ pipes and to install the forward units behind the ornamental grilles. By using the proper type of reflectors and baffles on the units, the grilles made no difference in the diffusion of the conditioned air. At the rear of the theatre (bottom picture) the two units are right out in the open, and, being of trim line and attractive appearance, they become a pleasing addition to the standee area, as well as being their own best advertisements for the "extra added" comfort provided by the theatre's management. The middle picture shows a close-up view of one unit at the rear of the theatre.





Freon—A Modern Chemical Achievement

Use of Refrigeration and Air Conditioning Made General by Halogenated Hydrocarbons

R. J. Thompson
Kinetic Chemicals, Inc.

Eighteen years ago the Freon refrigerants had not been announced to the world. There was an active demand for a group of non-toxic and non-flammable refrigerants. Dr. Thomas Midgley, Jr., and a group of chemists, engineers, physicists, and toxicologists were working on the problem. Midgley and Henne discovered that a group of chemical compounds called halogenated hydrocarbons having one or more fluorine atoms had the desired properties, and certain of these compounds were practically ideal for the purpose. In April, 1930, Midgley announced these products to the scientific world, and the following year Kinetic Chemicals, Inc., first offered them for sale.

The American refrigerating equipment industry soon adapted machinery to the use of Freon. Today there is scarcely a refrigerating machinery company in the United States, and very few in the world, that does not build equipment for Freon.

The Freon refrigerants have been tested for safety by the United States Bureau of Mines and the Underwriters' Laboratories.

All of the electric refrigerators which are now sold contain one or another of the Freon refrigerants, and practically all of the air-conditioning equipment which is offered contains these refrigerants. During the past year more tonnage of refrigerating machinery has been built for Freon than for all other refrigerants combined.

REFRIGERATION

In the past decade refrigerating machinery through its far-flung uses has given us a whole new set of eating and living habits. Preservation of foodstuffs and conditioning of the air we breathe have added immeasurably to our health, comfort and general enjoyment of life.

Twenty years ago electric refrigerators in the home were a novelty, and only a fortunate few had them. Most of them were noisy, and few of them efficient. Today electric refrigerators are built to operate so efficiently that they require less than the amount of current consumed by an electric light bulb.

Of the nearly thirty million homes in the United States that are wired for electricity, slightly more than half have electric refrigerators, and around 4,000,000 new ones are being sold each year.

But the foods put into household refrigerators could not be had without the refrigeration that protects them on their way to the home. Fresh meat is chilled at the packing house, shipped in refrigerated cars, stored by the wholesaler in refrigerated warehouses, and by the retailer in walk-in coolers or refrigerated display cases, or both. Citrus fruits or vegetables are chilled in pre-coolers before shipping and are preserved by refrigeration until the day you buy them. The ships that transport bananas from Central America have cooled, air-conditioned cargo holds in order that your fruits may be delivered to you in the most palatable condition.

Through a more recent development—quick freezing—the flavor and quality of perishable foodstuffs are preserved. These quick-frozen products are becoming more common every day, and to keep them in a frozen condition merchants are installing new low-temperature refrigerators and new display cases.

AIR CONDITIONING

Everyone has become familiar with air-conditioning, enjoying its benefits in theatres, motion picture houses, department stores, shops, office buildings and chain stores. In practically every case one or another of the Freon refrigerants are used.

Homes

Most complete domestic air conditioning now installed is for new homes. The recent development, however, of efficient, self-contained units that provide economical room air-conditioning is now meeting the demand for home and office use. A number of leading equipment manufacturers are offering models that perform complete summer air conditioning.

Transportation

The Baltimore and Ohio Railroad was interested in affording the public an entirely air-conditioned sleeping car train from New York to Chicago. In order to provide the train with lightweight equipment, it was necessary to have a safe refrigerant that would neither cause a panic nor injure any of the passengers in case it leaked into the cars. The Capitol Limited, as the train was named, was equipped with air-conditioning apparatus containing a Freon refrigerant.

At the same time the Chesapeake & Ohio Railroad was equipping its crack train, the George Washington.

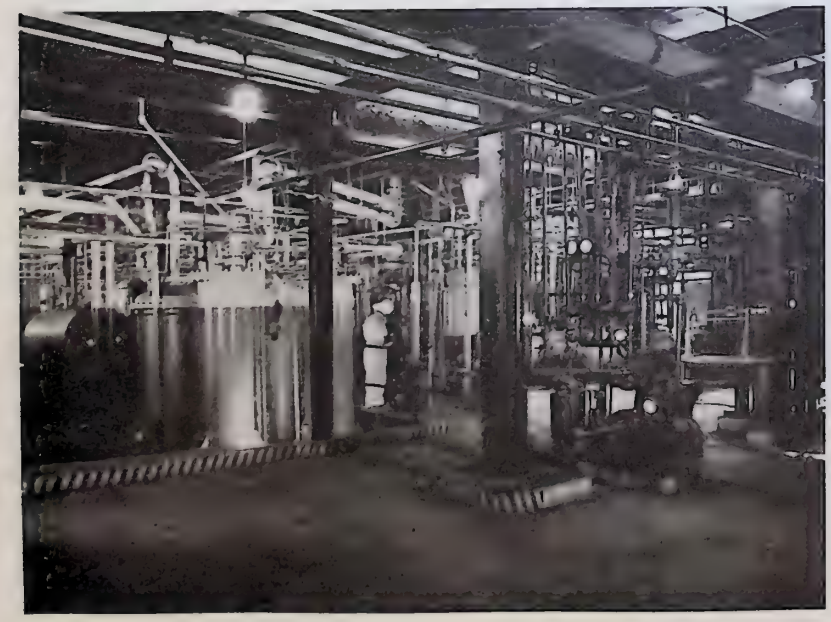
Today 100 per cent of all mechanically air-conditioned railroad cars in the United States employ Freon refrigerants; and the majority of the air-conditioned cars, especially on the longer runs, are merchanically equipped.

Now motor buses are being air-conditioned. All the equipment built for these buses so far has employed a Freon refrigerant.

Mines

A few years ago it was found that it was nearly impossible for the native

EASY AS FREON IS TO USE, the manufacturing process appears far from a simple routine. Details of the process are, of course, a trade secret, but this interior view of manufacturing operations of Kinetic Chemicals, Inc., shows a maze of pipes, valves, and tanks which in part reflects the technical and engineering details and complexities that go into making of such accepted products as Freon.



labor mining gold at the mines located in the Witwatersrand, near Johannesburg, South Africa, to stand the high temperatures at the bottom of these mines, both of which are over a mile deep. At the 6,300-foot level in the East Rand Proprietary Mine air-conditioning machinery with Freon for cooling the air in the mine has been installed. Another manufacturer put in a system for cooling the Robinson Deep Mine, where the men are working at the 8,300-foot level.

Navy Craft

Still another group of men who appreciate the safety features of Freon-12 are the sailors who operate the submarine boats of the United States Navy. These men live in an atmosphere artificially created and artificially cooled, where health is guarded, and where every device to prevent accidents is provided. The recent air-conditioning installations are of the reverse-cycle type, cooling the atmosphere when the boats are cruising in the tropical waters and warming it in the Arctic. Destroyers, aircraft carriers, battleships, minesweepers, and every type of Navy craft have been provided in the last 15 years with refrigeration employing Freon-12.

Government Buildings

The great government buildings in Washington, including the United States Capitol, the Senate Office Building, the Library of Congress, the Old House Office Building, the New House Office Building, the Post Office Building, the Department of Justice Building, the Archives Building, and the Administration Building of the Department of Agriculture, are all air-conditioned with Freon, comprising over 12,000 tons of refrigeration.

THE FREON REFRIGERANTS

The family of Freon fluorine compounds, of which there are many members, satisfy wide fields of application where panic, health, fire, and property damage hazards are to be eliminated. The Freon compounds when used as refrigerants, having characteristic physical and thermodynamic properties, adapt themselves for use in reciprocating, rotary, and centrifugal type compressors which vary in size from fractional refrigeration tonnage up to 2,250 tons capacity; they produce wide ranges of temperatures that vary from normal room temperature to those low sub-zero temperatures beyond those found in nature and for conditions necessary for body comfort air-conditioning, processing and preservation of foodstuffs, and the wide variety of needs for industrial applications. There is a Freon refrigerant for every design, size, temperature requirement, purpose or use in mechanical refrigeration equipment.

Other uses for the Freon compounds are as solvents, intermediates, propellents, aerosol ingredient solubilizers, and propellent diluents or pressure reducers.

The Freon compounds are clear and water-white, odors of the vapors are mild and somewhat ethereal but disappear when mixed with air, non-irritating to the eyes, nose, throat, lungs, and skin, non-toxic, non-flammable, non-explosive, non-corrosive, stable, and inert.

Freon-113

Freon-113, trichlorotrifluoroethane ($C_2Cl_3F_3$), has a boiling point of 117.6 degrees Fahrenheit, and is used as a refrigerant in industrial and commercial air-conditioning systems; also, in industrial process water and brine cooling to 0 degree Fahrenheit, employing four or more stage centrifugal type compressors of 25 tons refrigeration capacity and larger. Freon-113 has been found satisfactory for use as a solvent or extractant in yarn and fabric finish anaylsis.

Freon-11

Freon-11, trichloromonofluoromethane (CCl_3F), has a boiling point of 74.7 degrees Fahrenheit, and has wide usage as a refrigerant in indirect industrial and commercial air-conditioning systems; also, in industrial process water and brine cooling to —40 degrees Fahrenheit employing single or multi-stage centrifugal type compressors of 100 tons refrigeration capacity and larger. Freon-11 is used as a solubilizer for DDT and as a pressure depresser or reducer for the propellent Freon-12 as used in insecticidal aerosol.

Freon-114

Freon-114, dichlorotetrafluoroethane ($C_2Cl_2F_4$), has a boiling point of 38.4 degrees Fahrenheit, and is being used as a refrigerant in fractional horsepower household refrigerating systems and drinking water coolers employing rotary vane type compressor; also, in indirect industrial and commercial air-conditioning systems and in industrial process water and brine cooling to —70 degrees Fahrenheit, employing multi-stage centrifugal type compressors of 100 tons refrigeration capacity and larger. Large installations using Freon-114 are at the neoprene plant at Louisville and ten 2,250-horsepower units at the Hanford Plant in the state of Washington.

Freon-21

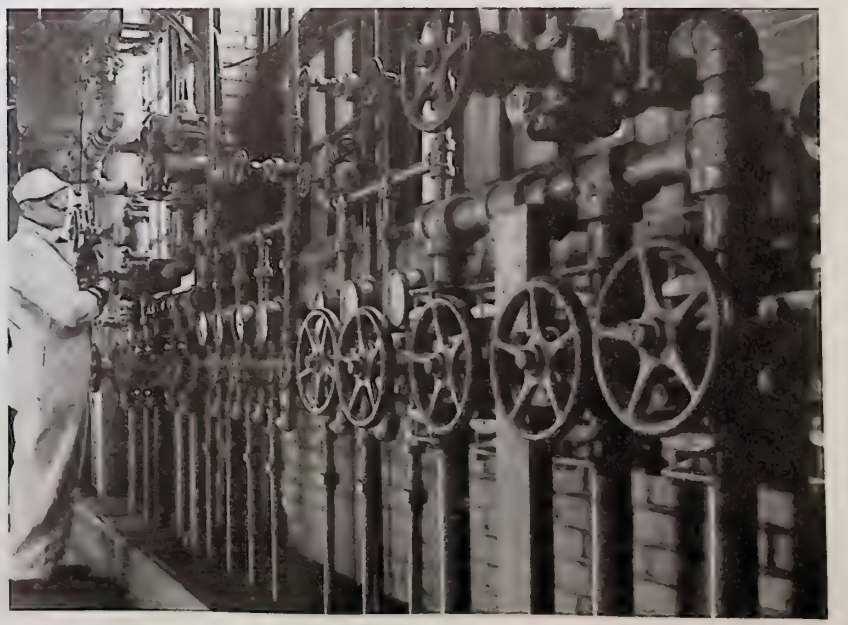
Freon-21, dichloromonofluoromethane ($CHCl_2F$) has a boiling point of 48 degrees Fahrenheit, and may be used as a refrigerant in industrial and commercial air-conditioning systems; also, in industrial process water and brine cooling to —50 degrees Fahrenheit employing single or multi-stage centrifugal type compressors of 100 tons refrigeration capacity and larger; also, Freon-21 has been used in fractional horsepower household refrigerating systems and drinking water coolers employing rotary vane type compressors; also, Freon-21 has been used in comfort-cooling air-conditioning systems of the absorption type where dimethyl ether of tetraethylene glycol was used as the absorbent.

Freon-12

Freon-12, dichlorodifluoromethane (CCl_2F_2), has a boiling point of —21.6 degrees Fahrenheit, and is extensively used as a refrigerant in both direct and indirect industrial, commercial, and household air-conditioning systems; also, in household refrigerators, ice cream cabinets, frozen food cabinets, food locker plants, water coolers, and so forth, employing reciprocating type compressors ranging in size from fractional to 800 horsepower. Freon-12 is also used in household refrigerating systems, ice cream and frozen food cabinets employing rotary vane type compressors.

Freon-12 is used in industrial process water and brine cooling to —110 degrees Fahrenheit employing multi-stage centrifugal type compressors in cascade of 100 tons refrigeration capacity and larger. One such installation has been made in the world's largest low-temper-

WHEN SERVICING refrigeration or air-conditioning equipment, where a liquid refrigerant is involved, it is recommended that large lens spectacles or goggles be worn—as is this attache of Kinetic Chemicals, Inc., at the Wilmington plant—to prevent the low boiling point refrigerant frome entering the eyes and causing freezing of the moisture around the eyeball, which would be a most painful injury.



ature refrigeration plant for the National Advisory Committee for Aeronautics test tunnel in Cleveland, and consists of fourteen 1,500-horsepower, four-stage, centrifugal-type compressors with a refrigerant charge of 58,000 pounds of Freon-12. The main purpose of this refrigerating system is to extract the heat generated in the tunnel by the fan which circulates the air at 500 miles an hour and by the engine on test and, at the same time, maintain a temperature of —80 degrees Fahrenheit, corresponding to the altitude of approximately 50,000 feet.

Freon-12 has had wide usage and practically universal acceptance as an aerosol propellent of many different kinds of chemicals, such as, insecticides, germicides, fungicides, insect repellents, deodorizers, and perfumes; and probable use in leg colors and hair dressings.

Freon-22

Freon-22, monochlorodifluoromethane ($CHClF_2$), has a boiling point of —41.4 degrees Fahrenheit, and is used as a refrigerant in industrial and commercial low temperature refrigerating systems to —150 degrees Fahrenheit employing reciprocating type compressors and for a multitude of uses, some of which are these:

1. Calibration of temperature measuring devices.
2. Accelerated aging of steel for the production of precision tools and gauges.
3. Cooling of metal bushings or shafts for shrink fits.
4. Cooling and storage of aluminum rivets, spars, and sheets to prevent aging before fabrication.
5. Hardening of pitch to make it brittle and easily removable from lenses.
6. Testing of airplane engines, instruments, radio sending and receiving sets, radar equipment, calibration of instruments and measuring devices, hydraulic equipment and accessories.
7. Cooling of oil or other coolant in high-speed machining and cutting operations.
8. Cooling of brine circulated to welding tips.
9. Low temperatures for the production and storage of penicillin and blood serum.
10. Low temperatures for the storage of blood for plasma, production of blood plasma, and storage of blood plasma.
11. Low temperature chamber designed to duplicate stratospheric conditions for the testing of instruments, flying clothes, personnel, equipment, and construction of operating materials.

Freon-22 will be used in many installations where more efficient operation is desired in providing the necessary lower temperatures for low temperature locker plants, lower temperatures and resulting quicker freezing of foodstuffs, and greater volume of product handled by quick freezing units, home or farm freezers, and countless numbers of low temperature industrial applications.

Freon-22 is being used as an intermediate for the production of polytetrafluoroethylene, and this material with most unusual qualities is offered by DuPont under the trade name of Teflon. This polymer is unique among organic compounds in chemical inertness, resistance to change at high temperatures and extremely low dielectric loss factor. Teflon is extremely resistant to attack by corrosive reagents and to dissolution by all the solvents that were tried. No substance has been found that will dissolve or even swell the polymer at room temperature and pressure.

Freon-13 and Freon-14

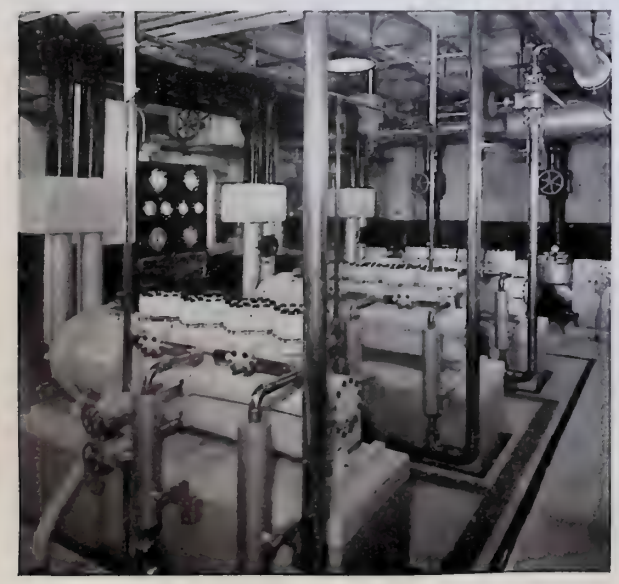
Freon-13, monochlorotrifluoromethane ($CClF_3$), and Freon-14, tetrafluoromethane, or carbon tetrafluoride (CF_4), two compounds recently added to the Freon family, have boiling points of —114.5 degrees Fahrenheit and —198 degrees Fahrenheit, respectively, and will undoubtedly find usage as refrigerants in extremely low temperature industrial refrigerating systems approximating liquid air temperatures, and will be employed in cascaded reciprocating type compressors. The use of these two Freon refrigerants will require thorough investigation and research as to the behavior of metals at low temperatures and under stress, lubrication of mechanical compressors, and the possible development of more efficient insulating materials.

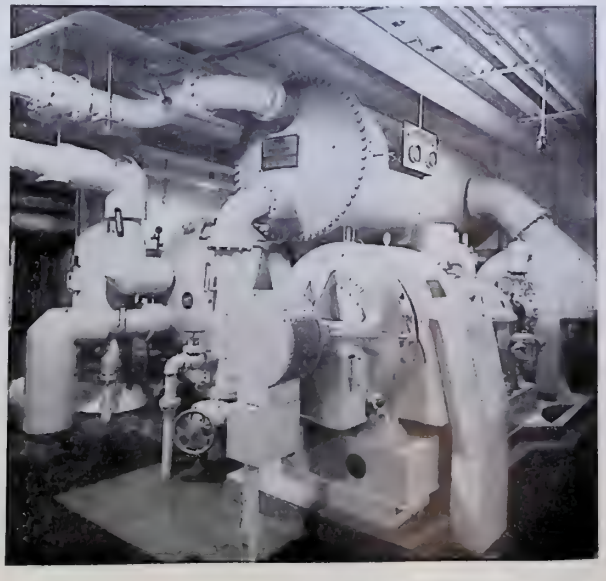
FREON IN THE THEATRES

Capacity crowds reward the owner of the air-conditioned theatre during the hot summer months. The air-cooled theatre offers relief from stifling discomfort. Cooling comfort is a showhouse attraction even without a first-rate show. People seek the theatre offering cool, refreshing air for they know that a good show and air-conditionad comfort are twin attractions with an irresistible box-office appeal. Some of the finest pictures and shows play to half empty houses when theatres do not offer cool inviting comfort during the summer months. Summer attendance is tremendously increased after air-conditioning is installed and smaller houses which have installed cooler systems have gained in prestige at the expense of the larger theatres which have ignored public insistence for air-conditioning.

The refrigerants used in theatre installations for making all of this possible are Freon-113 or Freon-11 in centrifugal-type compressors, especially in the larger theatres, and Freon-12 in reciprocating-type compressors varying in size from the smallest to the largest horsepower or tonnage refrigeration effect. Freon-12 is also widely used in the fractional horsepower size of system for foyer installations of ice-cream cabinets, soda fountains, and beverage and water coolers.

TYPICAL OF THE MODERN EQUIPMENT in which various members of the Freon family are used as the refrigerant is this reciprocating-type compressor (left), manufactured by the Westinghouse Electric Corporation (in a system designed and installed by Western Air and Refrigeration, Inc., for the West Coast center of the National Broadcasting Company); and the centrifugal-type compressor (right), manufactured by the York Corporation (installed in the Stix, Baer, and Fuller department store in Saint Louis). (All of the photographs are through the courtesy of Kinetic Chemicals, Inc.)





The Control of Humidity in Comfort Cooling

Adjustment of Amount of Water in the Air Essential to Make Comfortable Conditions

F. M. Johnson
Surface Combustion Corporation

Whether the air in an air-conditioned building is comfortable or not depends primarily on two basic factors — temperature and humidity. The air cannot be made comfortable unless both are maintained in their proper relationship.

HUMIDITY AND COMFORT

Persons indoors in the summertime can be very uncomfortable at a temperature of 75 degrees Fahrenheit, if the humidity is too high. Even though the temperature would otherwise be within the comfort range, if the humidity is not in proper relationship with it, the result is often a chilly claminess which is not only very uncomfortable but unhealthy.

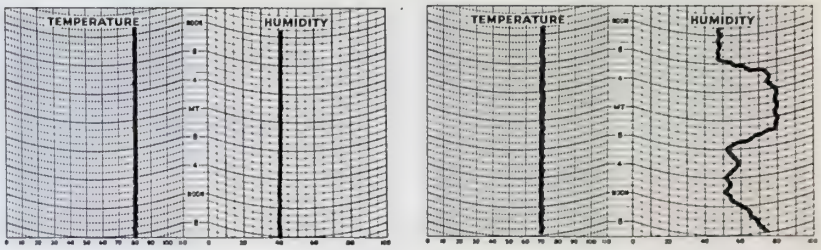
When the humidity in a summer air-conditioned space is properly controlled, it is not necessary to lower its temperature as much to make it comfortable, as it is when the humidity is too high. It has been found in actual practice, for instance, that 82 degrees Fahrenheit and 40 percent relative humidity in a conditioned space is far more comfortable, healthful, and free from shock than a space held at 75 degrees Fahrenheit with 65 percent relative humidity. The complaints which we have experienced from air-conditioning can be corrected by assuring proper control of humidity first. Then the problem of temperature control becomes comparatively simple.

CRITERION OF COMFORT

The best criterion for comfort in an air-conditioned space is that persons present are not conscious of the atmosphere or of any artificial change in it. In order to accomplish this condition, it is necessary to control temperature and humidity in their proper relationship and also eliminate odors, get the correct air circulation with sufficient cleanliness. The most comfortable atmosphere you have ever experienced, perhaps in your favored vacation retreat, will live up to all of these specifications.

On the basis of specifications just outlined, it is easy to see why so many air-conditioned spaces fall short of true comfort. If all of the requirements except odor removal, for instance, are properly taken care of air-conditioned space will still be uncomfortable.

The problem of adequately controlling temperature and humidity is still further complicated by the fact that both these factors in outdoor air vary over a wide range. A drop in temperature, for instance, may be accompanied by a rise in humidity and vice versa, so that equipment selected for one given ratio at one time may be entirely inadequate when this ratio suddenly changes. The only logical procedure, therefore, is to control temperature and humidity independently. The problem is reduced to its simplest form when humidity is controlled first —then temperature.



HYGROTHERMOGRAPH RECORDS show how steady both temperature and humidity can be controlled (left). When only temperature is controlled (right), the humidity of the test space follows a pattern comparable to that found out of doors (where the humidity, however, frequently reaches saturation). With such diurnal fluctuations in humidity, the maintenance of true comfort conditions is difficult.

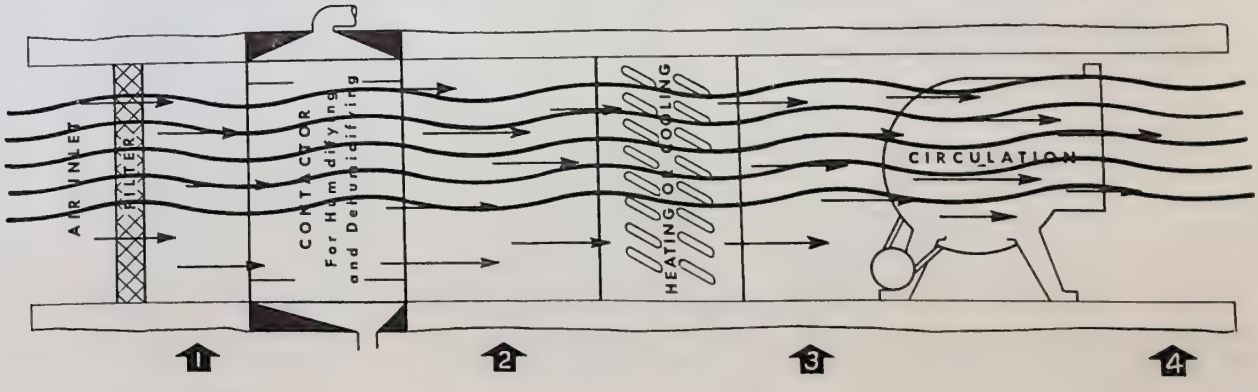
This discussion of the Kathabar System of humidity control is reprinted by special permission of F. M. Johnson from the brochure, "Control Humidity If You Want Comfort From Air Conditioning," published by the Surface Combustion Corporation.

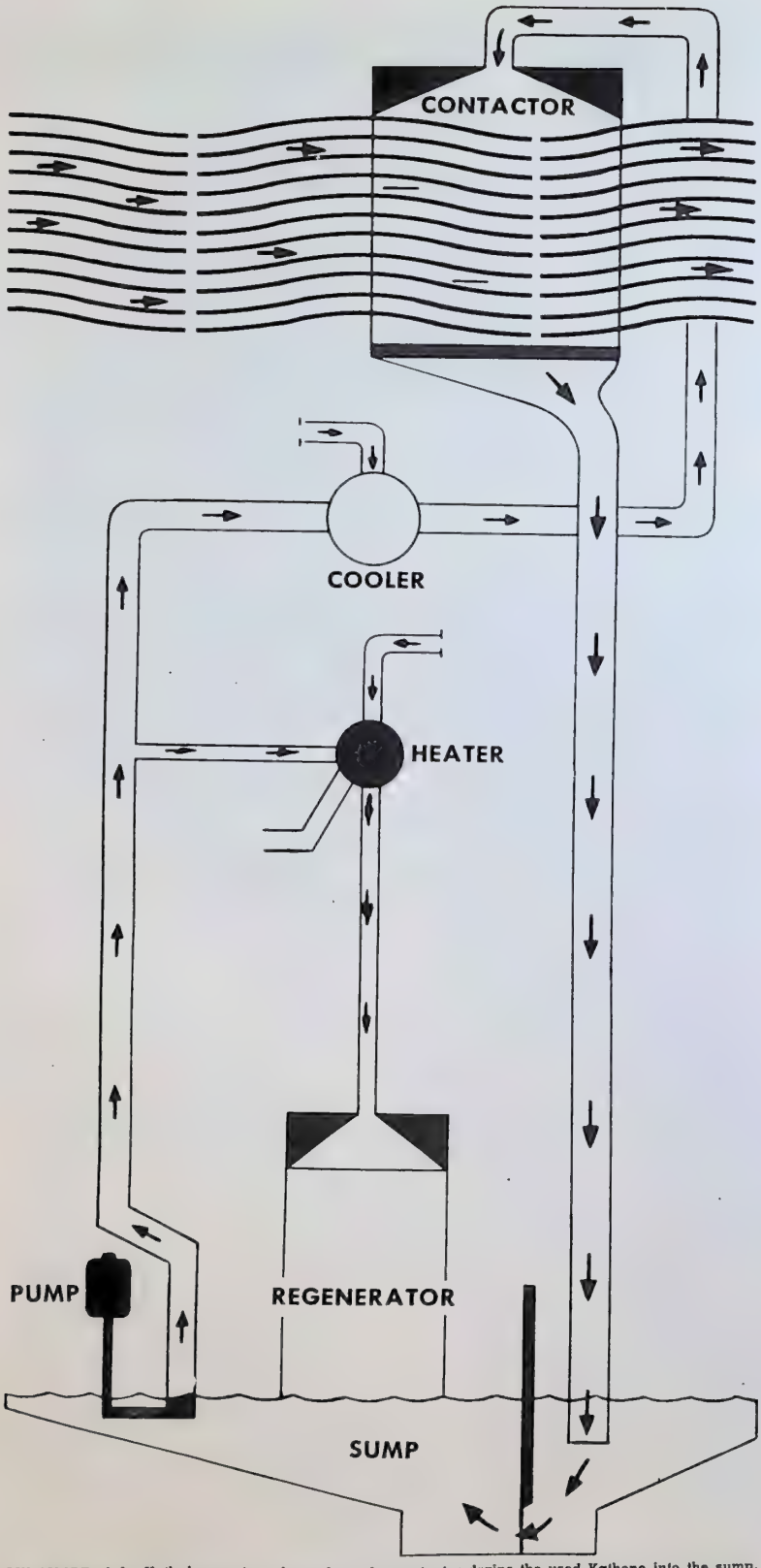
CONTROL OF HUMIDITY

The laws of physics provide just two alternatives to the dehumidification of atmospheric air: (1) The air may be cooled sufficiently below the dew point or "saturation point" to condense or squeeze the moisture out of it, and then it may be reheated to the required temperature, and (2) moisture may be taken out of the air by chemical means, in which case, the temperature need not be changed.

This latter method of removing the humidity to any desired point without

SCHEMATIC DIAGRAM of how the Kathabar system operates, shows the air entering at the left and immediately passing through an air filter. The filtered air (arrow 1) passes into the contactor, where it is humidified (in winter service) or dehumidified (in summer service). From this point (arrow 2) the air at the proper humidity passes over heating (or cooling) coils. Properly adjusted as to both temperature and humidity (arrow 3) the air passes to the fans and into the circulation system (arrow 4). Thus is true conditioned air delivered for the comfort of the patrons.





FLOW CHART of the Kathabar system shows how the contactor drains the used Kathene into the sump, from which the liquid is drawn by a pump. Part of the fluid is heated and passed through the regenerator, while the other portion is routed back to the contactor for re-use. Required is a circulating pump and a regenerator fan. Power requirements are small compared with refrigeration requirements.

changing temperature has many advantages, not only from the standpoint of operating cost but from a simplification of controls. This is the principle on which the Kathabar System operates.

Engineers are finding that humidity control in air-conditioned buildings can be more easily achieved at the source, that is, by humidity conditioning the make-up air taken from outdoors. When this is done, the cooling load is reduced approximately one-third and the power requirements for operating the remaining cooling equipment are reduced as much as 15 to 20 percent. In many cases, adequate cooling can be accomplished with well water alone. This simplifies the entire problem by eliminating face and by-pass dampers, cooling coils compromised for both temperature and humidity reduction, expensive coils for reheating, and insures dry, clean coils, thereby eliminating one of the great sources of dissatisfaction—wet, dirty coils, which contribute to odors in the conditioned space.

HOW KATHABAR OPERATES

It is not uncommon on a sultry, summer day to experience difficulty with the common salt shaker clogging up because its contents had absorbed moisture from the air and gotten soggy. Obviously, if there were enough salt shakers in the immediate vicinity, all the moisture in that air would be absorbed and persons present would be relieved of that sense of depression caused by heavy humid air. Kathabar is, in effect, the means of supplying enough salt or absorbent to reduce the humidity in the air to any desired point.

Kathabar uses a simple, healthful salt known as lithium chloride in solution, which comes into direct contact with the air being conditioned. There are many kinds of salt, some having greater affinity for water vapor or absorbing power than others. Lithium chloride is one of the most powerful absorbents and has proved to be the most practicable for air-conditioning purposes.

Kathene (lithium chloride and water) not only absorbs atmospheric moisture readily, but it can be regenerated—that is, the moisture which has been absorbed from the air can be readily removed from the solution by simply heating a small percentage of it automatically. Thus, the same solution can be reused any number of times.

Kathene solution used in the Kathabar System has another valuable characteristic for the selective control of humidity. Its absorbing ability can be controlled simply by controlling its temperature. The lower the temperature of the Kathene solution, the more moisture it will absorb and, conversely, the higher its temperature the less it absorbs, until a point is reached where it absorbs no moisture at all. Beyond that point, it gives up moisture to the air. Thus, the same lithium chloride solution or Kathene can also be effectively used to add humidity to the air simply by raising its temperature. Make-up water is automatically added to the solution so that a wide range of humidity control is thus provided.

The functioning of the Kathabar System is extremely simple, requiring only a small circulating pump and a small regenerator fan. The power require-

ments usually amount to from 8 to 10 percent of that required to accomplish the same result using mechanical refrigeration.

The Kathabar System consists of the Kathene solution made up approximately of 44 percent lithium chloride and circulated over an assembly of plates or cooling coil to bring the solution in direct contact with the air being treated. It is usually cooled by water from a cooling tower or by surface water. A small percentage of the Kathene solution (usually 10 to 15 percent) is automatically by-passed over an evaporator, where the solution is automatically heated to remove excess moisture and restore it to its original strength. This cycle is continuous, automatic, and very easily controlled.

COMFORT INSTALLATIONS

The Kathabar System is recommended for comfort installations because it reliably controls the humidity independent of temperature and, therefore, simplifies the entire air-conditioning problem by making it possible to control the important humidity-temperature ratio.

Because of its great capacity to dehumidify, it can usually dehumidify the make-up air low enough to compensate for the water vapor added by human occupancy and that which infiltrates from overly humid, outside air. Because of the remarkable ease with which this relationship between temperature and humidity can be maintained by the Kathabar System, it has become associated with the most outstanding air-conditioning installations in the country.

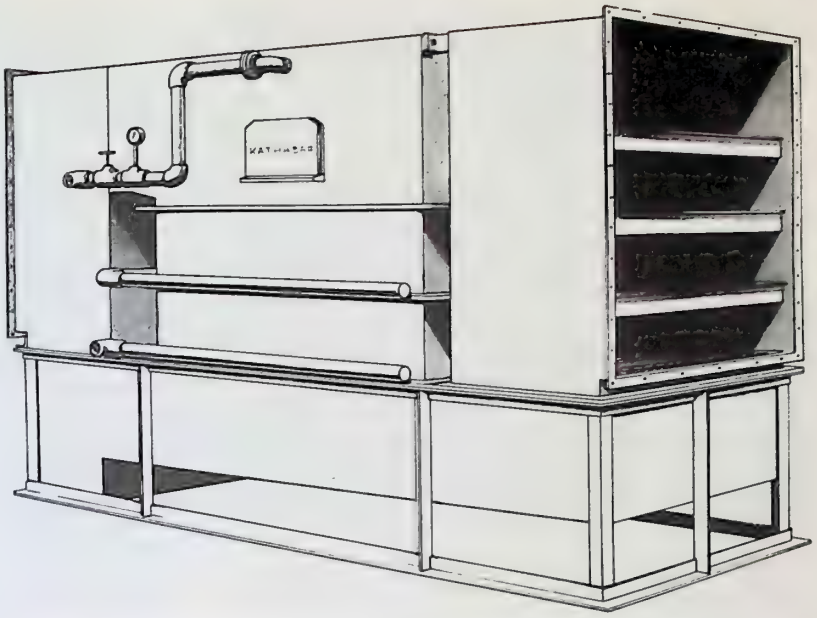
Next to its ability to dehumidify the air, Kathabar has the important function of odor removal—such as body and smoking odors. These are absorbed by the Kathene and automatically discarded in its regeneration.

This function results in a substantial saving because it removes the necessity for obtaining special equipment for this purpose or in such places as night clubs, theatres, restaurants, and auditoriums, of bringing in an excessively large volume of ventilating air from the outside, all of which has to be conditioned at extra cost.

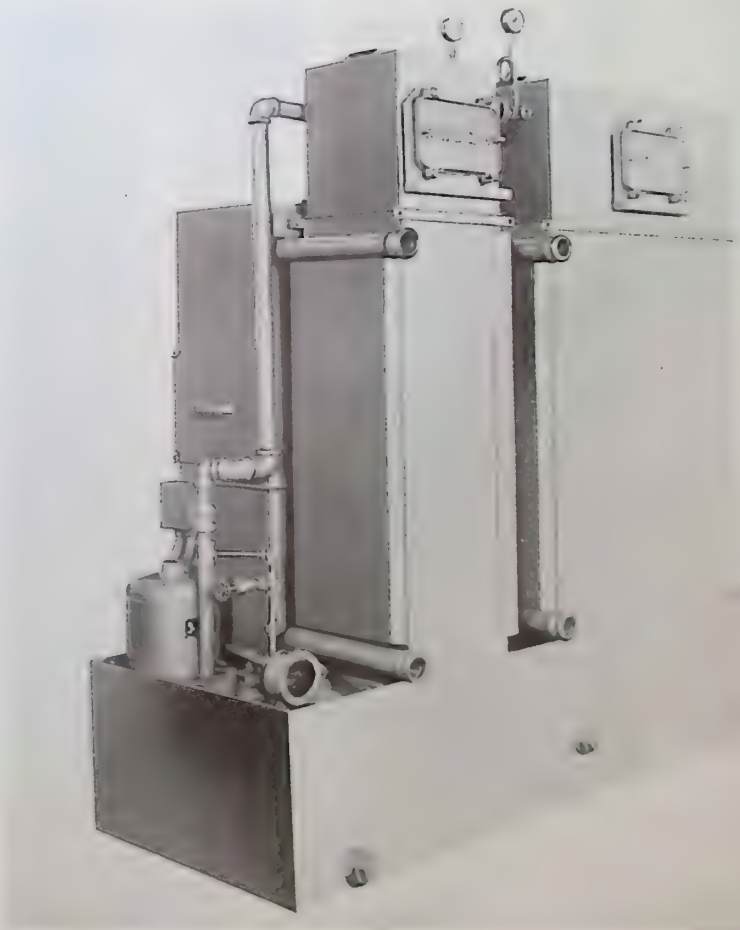
Where the moisture in the air is removed by condensing on coils, the usual result is an accumulation of wet, unsanitary, and unhealthy muck, which builds up around the cooling coils. Such a condition contributes to unpleasant odors and a stagnant feeling in the conditioned space. Some engineers recommend large quantities of make-up air in an effort to overcome this condition.

The Kathabar System, by chemically absorbing the moisture from the air, keeps the cooling coils dry and clean and entirely free from odors. Many engineers feel that this characteristic of the Kathabar System is one of greatest importance.

The fact that the men working in salt mines are not generally afflicted with common colds is said to be due largely to the antiseptic character of the surrounding salt contacting the air. Air passing through Kathene in the contactor unit of the Kathabar System tends to become sterilized for the same reason as the air in the salt mines. The thorough washing with Kathene also catches the fine dust particles which are not caught by the air filters.



THE AIR WASHER UNIT is used in central installations, where the regenerator is separate from the washer unit. Several of these units can be nested together to handle large volumes of air.



THE PACKAGE UNIT is self-contained, ready for connection and operation. Steam or gas, water, and electrical connections are provided externally for quick, easy hook-up by the installer.

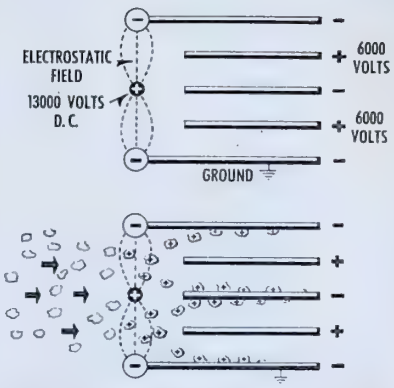
Air Cleaning by High-Voltage Electricity

Dirt, Dust, and Smoke Removed from Air In Ventilating, Air-Conditioning Systems

Electrical science has found a way to clean air of 85 to 90 percent of all dust and dirt, and deliver it economically and efficiently into theatres, office buildings, factories, and homes.

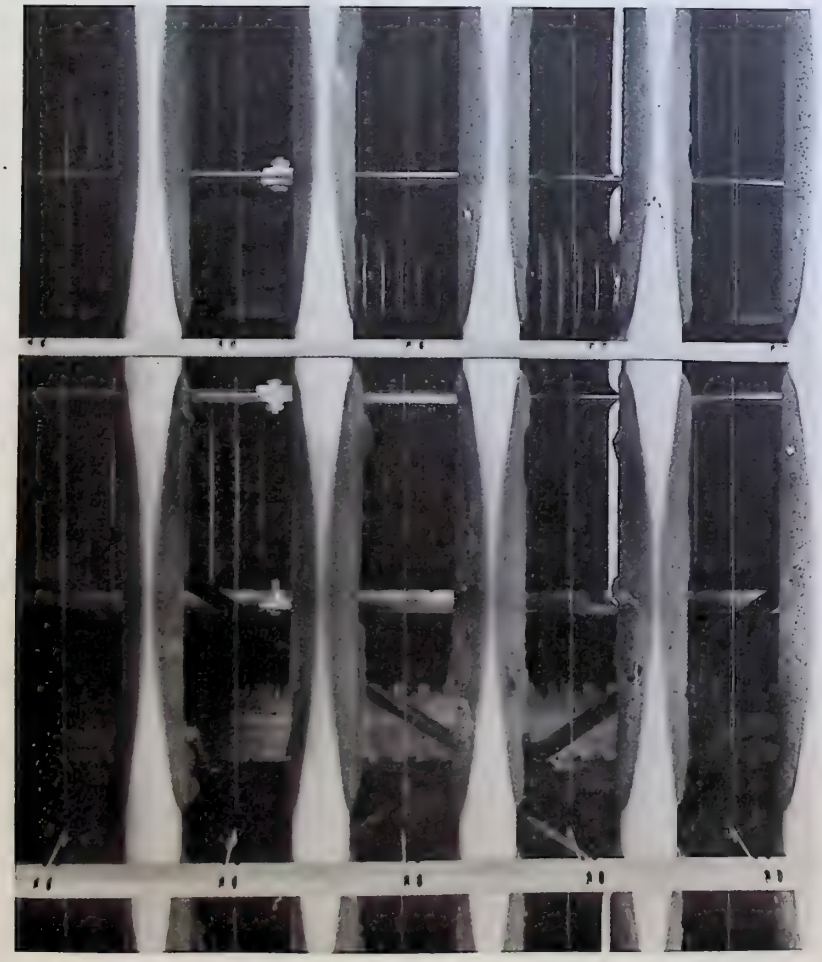
The apparatus using the electrostatic precipitation principle is effective against particles as small as 1/250,000 inch, or even such finer materials as oil mist and tobacco smoke. Although the principle of electrostatic precipitation has been known since electrostatic fields were first discovered, the equipment was not available for utilization in the ventilation and air-conditioning field until about 1933 when the Westinghouse Electric Research Laboratories developed the equipment which made this principle suitable for those applications where air is to be breathed by humans. In 1937 Westinghouse Precipitron units were installed for regular commercial installations in stores, office buildings, and so forth, and the use of this type of efficient air cleaning has grown by leaps and bounds.

During the war time, the advantages of electrostatic precipitation were recognized for many war industries in order to get ideal manufacturing conditions. Since the war, the application of this type of equipment is well recognized and is being employed in pratically all types of industry, commercial and industrial businesses. The largest manufacturers of this type of equipment are the Westinghouse Electric Corporation, the American Air Filter Company, and the Raytheon Manufacturing Company.



DIAGRAMATIC SKETCHES of the electrostatic field in the air filter and of manner in which the dust and other particles polluting the air become charged and are subsequently precipitated.

DIRT IS BUILT UP on the ground rod and cell plates in the dirty-air side of the Westinghouse Precipitron. The parallel plates of the collector are alternately charged with 6,000 d.c. volts and spaced 5/16 inch apart. Since unlike charges attract, the positively charged dirt particles are attracted to the negative plate and grounded. Every particle, regardless of size or makeup is here attracted.



THE HOW AND WHY

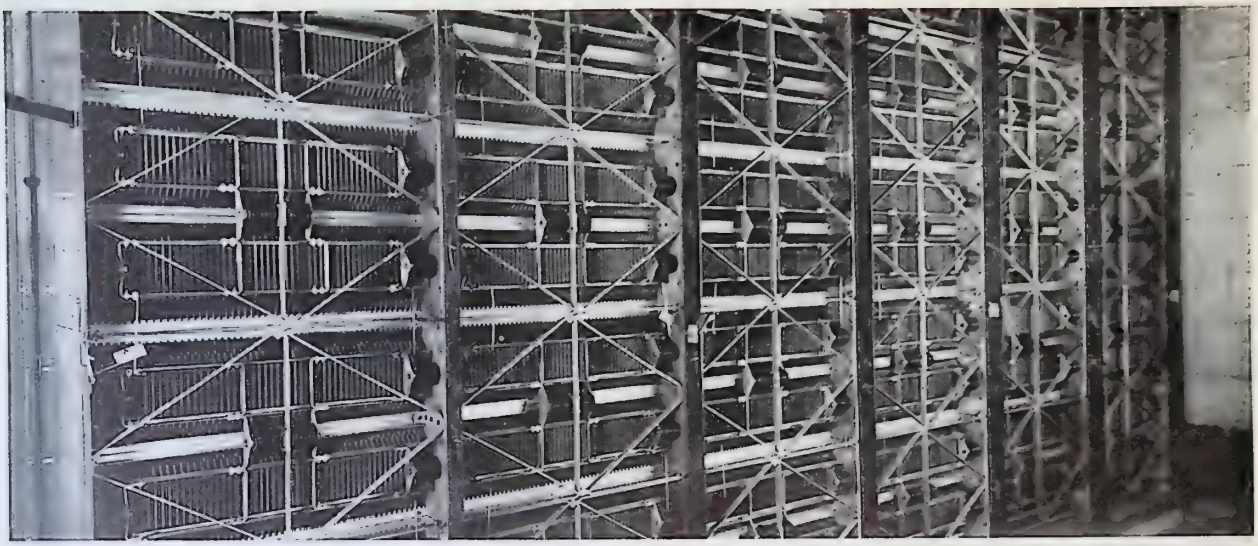
Briefly, the electrostatic method of dust precipitation utilizes the electrical principle familiar to every high-school physics student: that objects with like electrical charges repel while objects with unlike charges attract each other.

Air to be cleaned is delivered into a dust charger section where electrostatic field is created by a row of grounded aluminum tubes and hair-thin tungsten wires (similar to that employed in incandescent lamps) carrying some 12,000 volts. The high voltage in the air gap between the tube and wire causes the air minutely close to the wire to become ionized, or broken down into positively and negatively charged particles.

The negative ions that are formed in the ionization chamber leap back to the positively charged wires, but the positive ions race in the opposite direction at a speed of 140 miles an hour toward the negative metal tubes.

In flight, these ions strike the particles of dust or other foreign matter in the coursing air and stick to them and ride along and imparting to the foreign matter itself a positive charge.

The air then enters a dust collecting section which consists of aluminum or steel plates alternately charged negative and positive and set edgewise to the air stream. One set of plates is grounded and the other set carries a voltage of some 6,000 volts. Since opposite charges attract, the positive particles are attracted to the negatively charged plates, where they cling until flushed down the drain. Dust particles are taken out of the air stream and the air leaving the unit is clean. The effectiveness of the cleaning of air is generally shown by the soiling ability of the air left in the air stream. With the advent of equipment using electrostatic precipitation, new and improved methods of efficiency test-



THE CLEAN AIR SIDE of the Westinghouse Precipitron reveals a total absence of any evidence of dirt accumulation. The unit comprises, beside the collector, an ionizing unit and a power rack. The ionizers are supplied by the power rack with 13,000 volts a.c., creating a strong electrostatic field. As the air passes through this electrostatic field, every particle of foreign matter, regardless of size or makeup, received a positive charge. In the collector, the negatively charged plates attract the positively charged particles, precipitate them from the air, leaving it entirely clean.

ing were devised in order to show the relative efficiency of the various cleaning methods.

The collector plates are periodically washed down to remove the dirt. (It should be noted that the equipment is protected by automatic current cut-offs when service doors are opened for any purpose.) In some electrostatic precipitation units, washing equipment is completely self-contained, while on other models the collector plates are removed for cleaning.

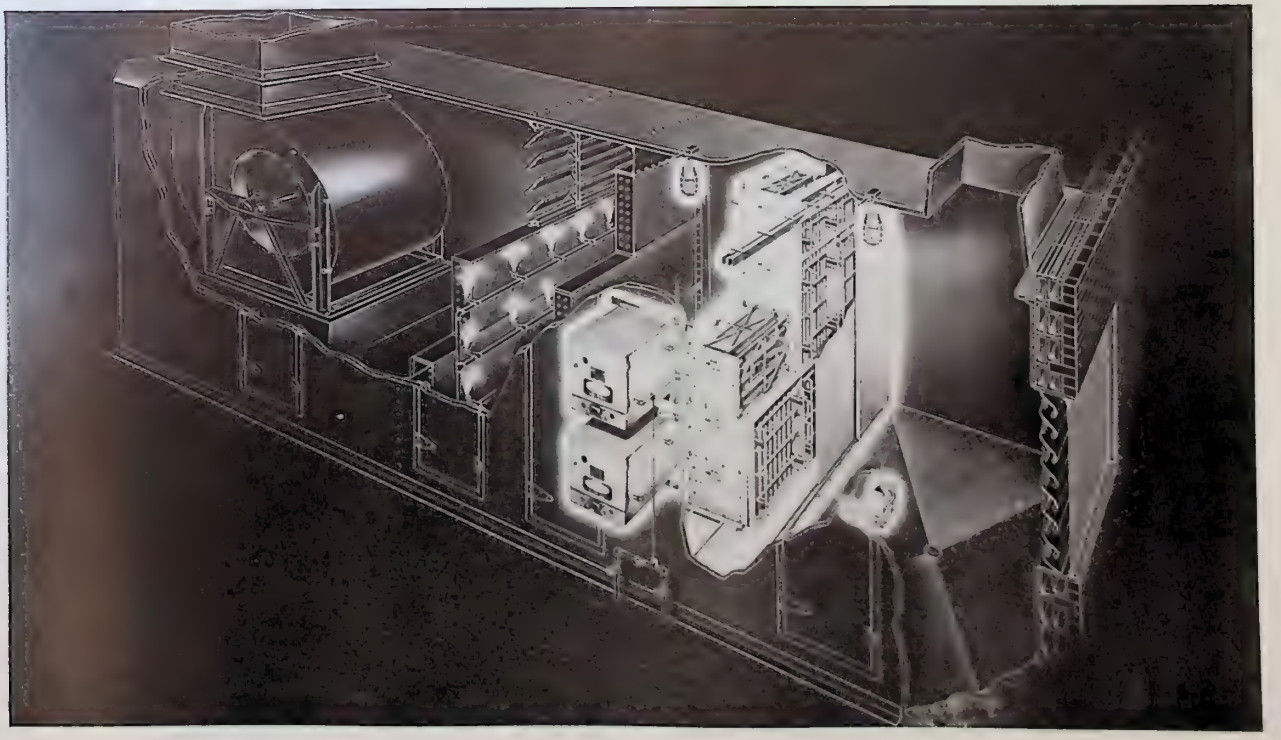
How often the plates have to be cleaned, of course, depends to a large extent on the amount of dirt in the air, but, generally speaking, it is not oftener than once a month.

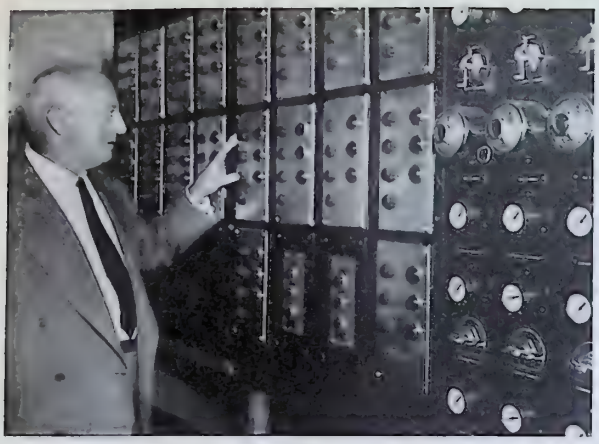
THE WHERE AND WHEN

For commercial and industrial use, the dust-charger and the dust-collector sections are built into unit assemblies which can be combined according to the needs of the building.

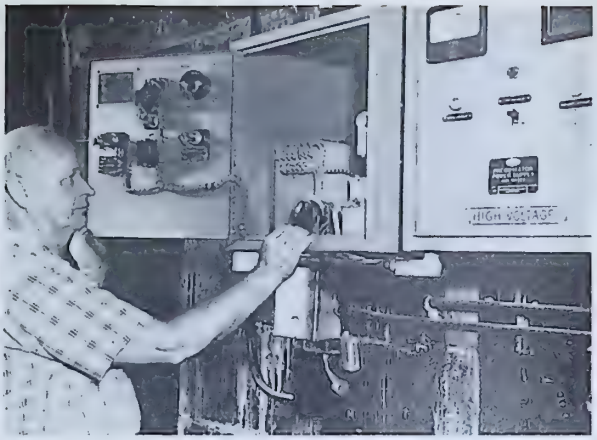
Multiple assemblies are connected side by side, or in tiers, to produce the clean air for larger buildings, such as theatres,

THIS CUTAWAY VIEW of a typical air duct shows a Westinghouse Precipitron as the cleaning component of an air-conditioning system. Air flow is from right to left. Fresh air enters through the screen and louvers at the right and recirculated air enters through the top. The air then passes through (1) the perforated doors that distribute it evenly to the cells, (2) the electrostatic field where the rust particles are charged, (3) the Precipitron cells where these charged dust particles are attracted by the oppositely charged plates. Therefore, only clean air leaves the duct system at the left.





PUSHING THE BUTTON that starts the new air-conditioning system is Gen. John Reed Kilpatrick, president of the Madison Square Garden. The Raytheon precipitator, which removes smoke and dust from the air in the system, is automatically turned on when the air-conditioning system is started.



ADJUSTING THE POWER PACK which supplies the direct current to the Raytheon precipitator, Howard Post, chief engineer of the Madison Square Garden, checks on the recently installed air-conditioning system which was designed by Charles S. Leopold, distinguished Philadelphia engineer.

hospitals, factories, stores, and offices.

An example of many recent installations is that incorporated into the air-conditioning system of the Madison Square Garden, New York, designed by Charles S. Leopold, one of the outstanding consulting engineers of the country.

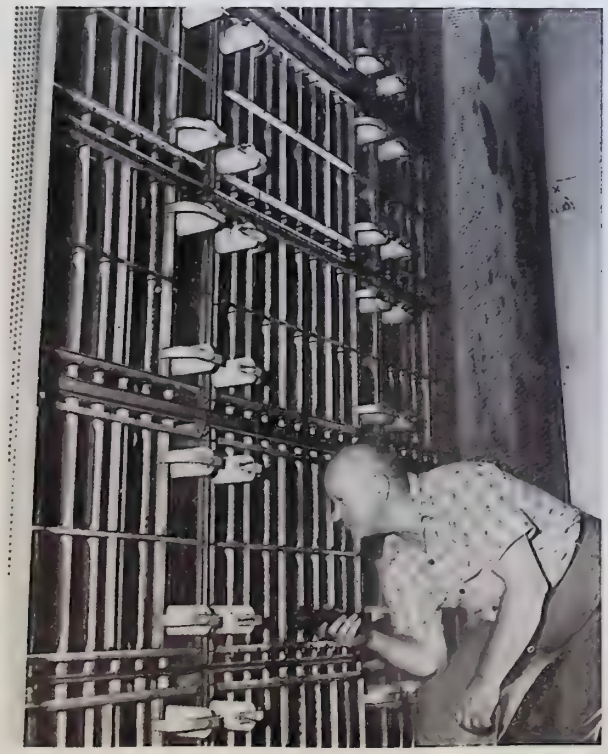
The new air-conditioning system is a composite of eight individual systems, each handling 67,500 cubic feet of air a minute—or a total of 540,000 cfm. for the entire system. And all this air passes through Raytheon precipitators where the removal of dust, dirt, and smoke is accomplished. The system, of course, is designed for year-'round operation, for heating, cooling, and humidification as needed for any particular event.

The precipitator installation comprises eight units, each having thirty cells and ionizers. The cross section of each bank of precipitators is 13 by 15 feet. The units are installed in the duct work, between the dehumidifiers and the fan, in such a manner that all of the air supplied to the Garden passes through the electronic filters.

According to Gen. John Reed Kilpatrick, the Garden's president, spectators at the famed sports events and spectacles "can enjoy these events in greater comfort than that afforded in any comparable indoor place of amusement." For those sitting in the balcony, eye strain is reduced to a minimum, since there is no longer the discomforting haze which formerly hindered vision.

Another recent installation, also designed by Charles S. Leopold, is the five units placed in the air-conditioning system of the New York Stock Exchange.

THE IONIZER of the Raytheon precipitator, installed in the Madison Square Garden, is being inspected by Howard Post, the arena's chief engineer. The ionizer creates an electrostatic field which ionizes all dust and smoke particles. These are then attracted to plates in the collector.



THE COLLECTOR CELLS of the Raytheon precipitator, installed in the Madison Square Garden's new air-conditioning system, are given a once-over by Howard Post, the Garden's chief engineer. Positively charged particles as small as 1/250,000 inch are cleansed from the air stream.



Solar Energy Utilization for House Heating

Sun's Radiation Can Be Captured for Uses In Heating and Possibly Air Conditioning

FOREWORD

The accompanying discussion of solar heating is a condensation of Report PB 25375 of the Office of Production Research and Development of the War Production Board, submitted in fulfillment of Contract WPB-100, and deals only with that portion of the report covering the construction of various experimental solar heat collectors and the general results and conclusions derived from the investigation.

For the technical details, mathematical formulae, and other details by which the investigators arrived at their conclusions, the reader is referred to the original report, obtainable at a fee through Library and Reports Division of the Office of Technical Services in the United States Department in Washington.

Application for patents on the basic principles and the improvements were made on December 3, 1945, under the Serial Number 632,504, by K. W. Miller and G. O. G. Löf. Licenses to the government have been granted.

INTRODUCTION

During the last 70 years, many attempts have been made to bring about more effective utilization of the great quantity of solar energy incident on the earth's surface.

Solar heat collectors might be classified in three ways: according to (1) the type of insulation used, (2) the degree of concentrated sunshine obtained, and (3) the nature of the orientation of the collector with respect to the sun.

Insulation of the heat collection surface is accomplished in several ways. In the flat plate collector, the insulation may consist of one or more spaced glass panes placed parallel to the absorbing surface and the sides and bottom could be covered with a layer of commercial insulating material. In the case of the tubular collector, one or more concentric glass tubes may surround the heat absorbing tube and, in some cases, a vacuum is maintained between the tubes.

In the flat plate collector, there is usually no concentration of the sun's rays, but in other types of collectors, reflectors are sometimes employed.

Any collector might be built with three types of orientation. It might be mounted permanently in one position so selected to gather the maximum amount of solar energy over the desired period; to improve its efficiency, the unit might be mounted so that its angle of inclination might be varied from day to day, so that it would always be perpendicular to the suns' rays; further elaboration may be used in the mounting to permit the unit to follow the hour angle of the sun, so that it is at all times in the position to obtain the maximum amount of radiant energy from the sun.

GEORGE O. G. LÖF, R. W. HAWLEY, *and* E. R. IRISH

In association with C. W. BORGMANN, C. H. PRIEN, W. B. PIETENPOL, B. H. SPURLOCK, M. M. DAVID, *and* J. P. POHLENZ

Departments of Chemical Engineering, Physics, and Mechanical Engineering, Engineering Experiment Station, University of Colorado, Boulder, Colorado

In the design of a solar heat collector, two factors of major importance must be considered. One is the quantity of heat available at the earth's surface, and the other in the temperature level at which it is collected. Mirrors which focus the heat of sunlight and allow it to be collected at relatively high temperature levels have been devised, but these have a disadvantage in that they collect only a small portion of the total energy. On the other hand, large quantities of heat can be collected at low temperature levels by the "greenhouse effect." This effect utilizes the fact that glass is transparent to visible and short infra-red wavelengths which make up the predominant portion of sunlight and is opaque to long infra-red wavelengths. When sunlight enters the greenhouse, it impinges on the contents and is changed to low temperature, long wavelength heat, which is trapped inside the glass enclosure.

Since focusing devices are quite expensive to build and to operate, it seems desirable to devise a method to utilize the greenhouse effect in such a way that the temperature level of collection is greater than previous designs have allowed.

A modification of the greenhouse effect was suggested by K. W. Miller, of the Office of Production Research and Development of the War Production Board, by which he proposed to raise the temperature level of the heat collected to several hundred degrees Fahrenheit. This plan involves the use of a large area covered by overlapping plates of glass. The area of each sheet of glass, which extends in the space on the underside, is coated with a radiation absorbing medium such as lampblack. Air is drawn slowly through the space between the plates, becomes heated, and is removed from the unit.

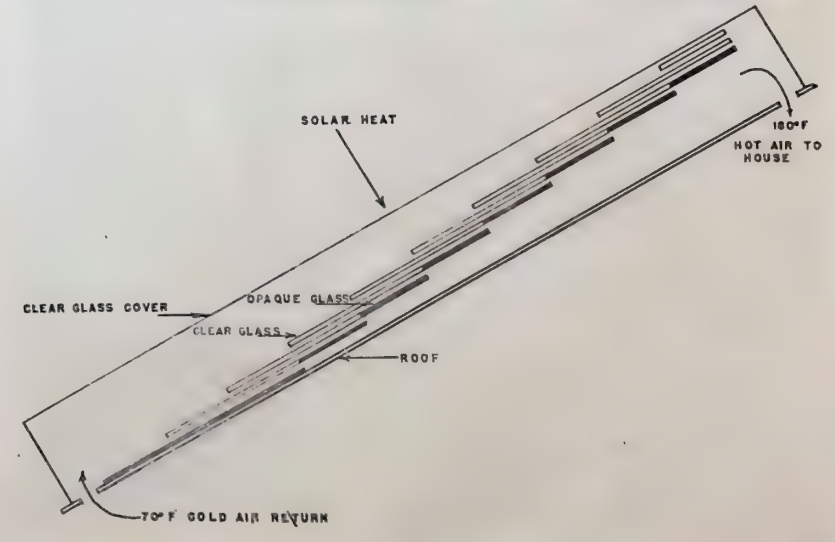
It is the purpose of this investigation to ascertain the workability of the scheme presented by Miller and to determine the optimum dimensions and configuration of the heat collecting unit. After it was found that the scheme offered an improvement over previous methods of solar heat collection, it was decided to place a unit in operation as an auxiliary heating unit in a private residence to determine its economic feasibility.

The following report describes in detail the work done and the results obtained during the course of the investigation, with the exception of the preliminary tests on an experimental indoor heat collector.

THEORY

The theory of the solar heat trap, as proposed by K. W. Miller, will be described in connection with Figure 1,

FIGURE 1—Diagrammatic sketch of a solar house-heating unit. A large area is covered by overlapping sheets of glass and enclosed within heat insulating walls. Solar heat impinges on the upper glass and the part that is transmitted to the black surface of the opaque glass is absorbed and changed into heat. As the black surface absorbs solar heat, its temperature rises and the heat is re-radiated.



which has been modified slightly from his original drawing.

A large area is covered by overlapping sheets of glass and enclosed within heat insulating walls. Solar heat impinges on the upper glass, part of it is multiply reflected back towards the sky, part is absorbed by the glass, and the remaining transmitted portion impinges on the black surface of the opaque glass where it is absorbed and changed to heat. As the black surface absorbs heat, its temperature rises, and it re-radiates in the far infra-red region to which radiation glass is opaque.

Air is drawn slowly between the glass plates. This air at base temperature picks up the solar heat energy absorbed in the glass. This air is passing counterflow to the heat flow by conduction through and along the glass plates and by radiative heat transfer upward between them. Thus, most of the heat attempting to escape upward from the high temperature end of the opaque glass plate is picked up by the air stream which, therefore, enters the opaque glass section at an elevated temperature. Very important is the fact that this air flow maintains the upper glass plates at a temperature not much greater than the air temperature. This re-radiation of heat energy back toward the sky from the upper glass is very materially reduced, since, quantitatively, it is proportional to the fourth power of the absolute temperature of the outer glass surface.

Miller has made a mathematical analysis of the operation of the above-described solar heat trap and has derived equations for use in the calculation of the possible heat recoveries and temperature levels of heat collection. The equations showed that exit air temperatures of 300 degrees Fahrenheit could easily be obtained in a unit built as shown and described in Figure 1. It was assumed, however, that no convection losses took place at the cover plate surface and that no heat loss by conduction through the sides or floor of the unit. These assumptions, along with the basic one that streamline flow prevails, make the actual predicted numerical results questionable even though their general order of magnitude may be correct.

FIGURE 2—The indoor laboratory (experimental) unit was built to obtain design information to aid in the selection of the proper glass plate arrangement in the proposed outdoor unit. The unit consists of a well-insulated rectangular box. Air at room temperature enters at one end of the unit and passes through a finned tube air heater and mixer and into the duct for subsequent utility.



CONSTRUCTION, OPERATION

The investigation of the collection and utilization of solar heat by the method which involves the use of overlapping glass plates as suggested by K. W. Miller was taken up in three phases.

The first phase consisted of building an experimental collection unit and an artificial light source indoors. Tests on this unit were to furnish such information as general workability, optimum plate spacing, optimum overlap, optimum plate length, and optimum air rate.

The data made available through the indoor unit studies were used in the design of a larger heat collection unit which was constructed on the south roof of the laboratory, and the data were checked under natural sunlight. The effect of changing solar angles was studied along with the effect of clouds and haze. Exit air temperature and over-all heat recovery were correlated with air rate and other operating variables.

These two phases being completed, the final phase of the investigation was to place a typical unit in operation in a local home and determine its usefulness in supplying heating requirements.

Indoor Experimental Unit

The indoor solar heat collection unit was built for the purpose of obtaining design information to aid in the selection of the proper glass plate arrangement in the proposed outdoor unit. Only a brief summary is given here because the work with the indoor unit yielded only preliminary design results.

The unit consists of a rectangular box 2½ feet wide, 12 feet long, and 1½ feet deep, well insulated against heat loss. Air at room temperature enters one end of the unit and passes through a finned tube air heater where its temperature is adjusted to the desired value by allowing steam, or water, or a mixture of both, to flow on the inside of the tubes. After leaving the air heater, the air passes through a short section of duct of reduced cross section where it is thoroughly mixed and its temperature measured by a high-velocity iron-constantan thermocouple. The air in the mixing chamber is protected from direct radiation from the light source by partitioning the duct and drawing a stream of air through the upper half; this insulating air, after being partially heated by radiation from the source, is discarded into the room. The air leaving the mixing chamber enters the heat collection chamber through a perforated baffle. (Figure 2.)

The heat collection chamber consists of a number of glass plates, defining a plurality of zones or passages through which the air is passed. These plates are arranged in staggered relation to each other and lie in a horizontal position. A section of the top surface of each plate adjacent to the trailing edge was made opaque by the use of black paint, and the corresponding bottom surface was coated with a layer of aluminum foil. This assembly is sealed from above by a continuous sheet of glass laid into a cover support. The construction is similar to that of the outdoor unit described in a later section where further details are presented.

An artificial source of solar energy

in the form on a bank of 84 1,500-watt electric tungsten lamps is situated 10 feet above the cover glass of the heat collection chamber, and interposed between the source and the cover glass is a sheet of double strength window glass which absorbs the excess infra-red radiation, so that the radiation impinging on the collection plates more nearly approximate that from the sun.

The heat collection chamber described makes up a length of 6 feet of the total length of the indoor unit.

The heated air leaving the heat collection chamber passes to a tapered exit section which is well insulated against radiant heat. (Compare with Figure 3.)

To make a run on the indoor unit, the independent variables are chosen and the unit is set in operation. These variables are spacing between plates, length of plate overlap, entrance air temperature, and air velocity. When equilibrium is reached, as shown by the attainment of constant temperatures, the run is discontinued, and a new set of independent variables is chosen. At equilibrium the following readings are taken: (1) air velocity, (2) entrance air temperature, (3) exit air temperature, (4) temperature of air leaving black surfaces of two plates near the center of the stack, (5) temperature of air leaving black surfaces of bottom and second plates, (6) temperature of air passing through rotameter, (7) surface temperature in center of blackened portion of central plate in stack (bottom plate temperature), (8) surface temperature three inches behind leading edge of central plate in stack (top plate temperature), and (9) cover plate temperature, under side. From these data, it is possible to calculate the efficiency of heat recovery if the heat input from the lamp bank is known.

The important conclusions of the tests on the indoor unit (Figure 2) were (1) the general principle of the heat collector as set forth by K. W. Miller was shown to be workable, (2) the optimum plate spacing was found to be ¼ inch, and (3) the optimum plate overlap was found to be 2/3. The plate length factor was not investigated thoroughly enough to draw any definite conclusions, but it is believed that a variation in plate length would not materially affect the operating characteristics of the unit, all other factors being constant.

Experimental House Unit

The experimental house unit was constructed on the roof of the home of Dr. G. O. G. Löf, at 1719 Mariposa Street, Boulder, Colorado. Figure 4 illustrates the construction of the unit.

Lying on the slope of the roof are 16 supports constructed of 2x6-inch lumber, supported and separated by iron strips which also act as supports for the cover glass. In the sides of these pieces are cut appropriate slots into which are driven narrow strips of composition board; the slots and strips are positioned so that they will support the glass plates in their proper relation. At the end of each strip is fastened a small wood block which prevents the glass plates from sliding down the roof. The assembly is built directly on top of the shingles of the roof; but before the glass is laid, a ½-inch layer of Celotex insulation is placed over the shingles. The supports are spaced on 32-inch centers and the glass plates are 30 inches wide by 36 inches long. The glass plates are placed in the optimum arrangement found in the tests on the outdoor unit which was found to be ¼-inch spacing, 2/3 overlap, with 12 inches of each plate painted black. The cover glasses are put in place in grooves cut in the top side of the supports and sealed with putty; the ends on the cover glasses overlap in the manner of a greenhouse glazing. A cap strip of sheet metal is placed on the top edge of each 2x6 to protect the seal from weathering. A flashing made of sheet metal covers the top and bottom ends of the unit.

The entrance air inlet is cut through the roof at the bottom end of the unit and a duct is built from the house cold air return to these openings in the roof. The heated air is drawn from the top of the unit through similar holes cut in the roof. The duct system employed for the hot air is shown in Figure 4, and consists of a large duct leading from the hot air outlets of the unit to the center of the attic where it branches into two. One branch leads to the bottom of the furnace and thence to the fan and into the hot air circulation system. The other branch leads through a finned tube water heater and thence to a natural circulation vent through the roof, the top of which is higher than the top of the solar unit. The finned tube heater is used to heat water when the heat is not needed to heat the house. This heated water is stored in a 120-gallon tank installed in the attic, as shown in the drawing. This tank is connected directly to the inlet of the automatic hot water heater.

Installed in this duct system are suitable controls in the form of thermostats, dampers, damper motors, and relays which permit the unit to be operated in the following manner automatically:

Case I—House is cold, solar unit is cold. The automatic gas furnace heats the house in the normal manner.

Case II—House is cold, solar unit is hot. The hot air from the unit goes directly to the furnace inlet and is blown by the furnace fan to the house heating system; the cold air return is routed back to the bottom of the solar unit.

Case III—House is hot, solar unit is cold. Heating not necessary, therefore dampers are closed and furnace not operating.

Case IV—House is hot, solar unit is hot. The hot air from the unit is vented through the natural draft vent after passing through the finned tube water heater.

Before the unit was placed in operation, the exit air temperature from each section was set at the same value by adjusting the air flow in the sections with dampers at the outlet of each section. The temperatures were measured by iron-constantan thermocouples.

It was found necessary or desirable to prevent breakage during the hail season by covering the solar heat collecting unit with a suitable screen. A galvanized iron screen with ¼-inch openings was used. This screen was supported on strips of wood 2x2 inches, fastened on top of each 2x6.

It was found that no protection from snow was necessary, since the tilt of the roof and the smoothness of the glass allowed the snow to slide readily off the unit (Figure 5).

By preliminary calculations and observations, it is found that the installation of the unit of 463 square feet on the roof of this house will furnish approximately 33 percent of the heating load required by the house for an entire winter if no storage facilities are available. Further calculations were made to show the advantage of a suitable storage unit for the storage of heat for one-, two-, and three-day periods. These calculations were based on the heat required during the previous year per degree-day of heating load, which was determined from gas-meter readings and degree-day figures procured from the Public Service Company.

FIGURE 3—The laboratory (experimental) unit was built to check, under outdoor conditions, the principles learned from the indoor model. This unit, however, is no longer used, having been superseded by the house unit designed and tested under actual operating conditions in Boulder, Colorado. It is, then, a transitional model between that of Figures 1 and 2 and of Figures 4 and 5.



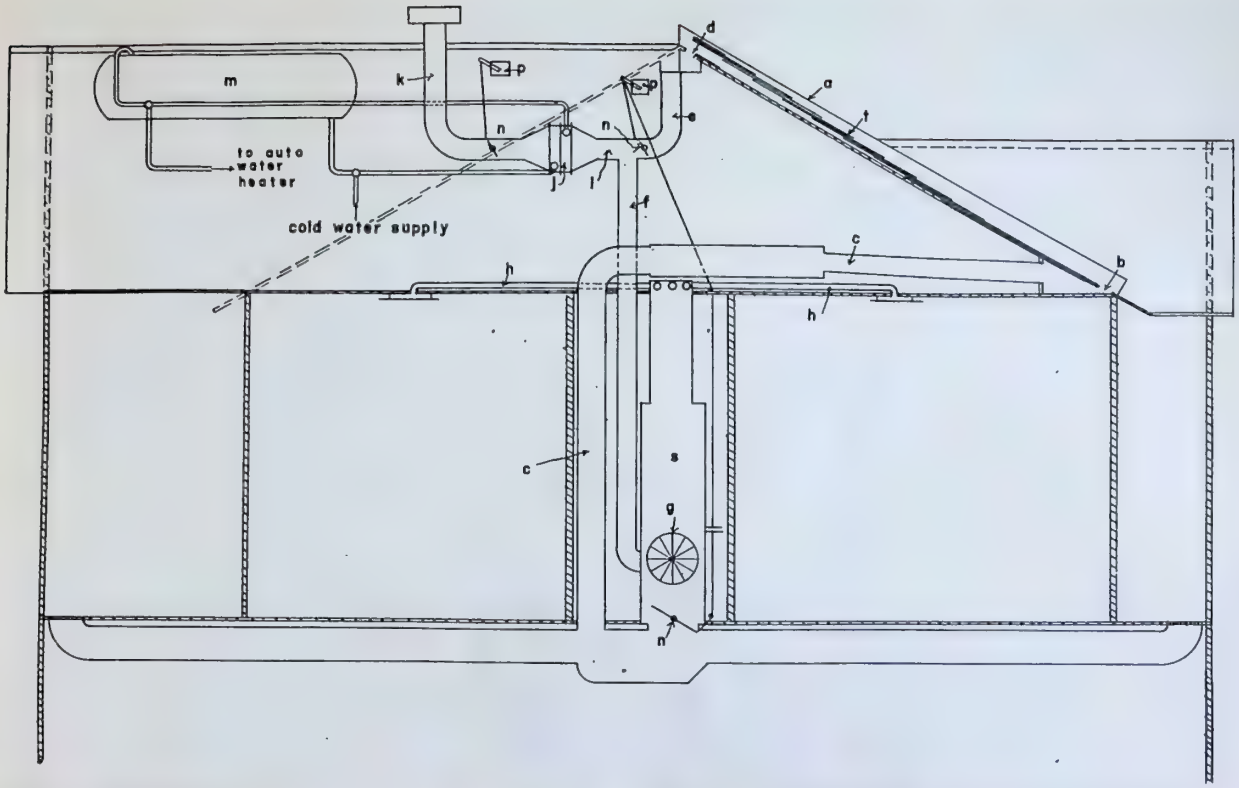


FIGURE 4—The experimental house unit was constructed on a roof in Boulder, Colorado. Lying on the slope of the roof are 16 supports constructed of 2x6-inch lumber, supported and separated by iron strips which also act as supports for the cover glass. In the sides of these pieces are cut appropriate slots into which are driven narrow strips of composition board so that they will support the glass plates in their proper relation. At the end of each strip is fastened a small wood block which prevents the glass plates from sliding down the roof. Snow is no problem.

During the heating season, the gas meters in the test house and in the identical adjacent house were read each month and compared in order to determine the fuel saving effected by the solar unit. The gas consumptions in the test house before and after the installation of the solar unit were also compared on a degree-day basis.

GENERAL SIGNIFICANCE

One of the most important results of the entire investigation is the proof of the workability of the principle advanced by K. W. Miller (in a memorandum dated July 12, 1943, to Office of Production Research and Development, War Production Board). Although experimental heat recovery efficiencies and exit air temperatures are not as high as predicted theoretically, the results indicate that solar energy can be used to heat air to temperatures in excess of 200 degrees Fahrenheit and that over-all heat recovery efficiencies of at least 35 percent of total can be secured.

Of perhaps the greatest practical significance is the fact that a solar heating unit was constructed and installed in a typical small home; was provided with completely automatic controls; was tied in with the normal heating system; and was operated satisfactorily throughout one complete winter. A fuel saving of approximately 20 percent was realized.

Other important specific results involve the details of construction and operation of the equipment. Such factors as the use of two-thirds overlap of plates painted one-third black on the upper surface, ¼-inch spacing between plates, plate lengths of 3 to 4 feet, support of plates on strips driven into wood section sides, and method of supporting cover plates are practical results in building and testing the equipment. The recirculation of house air through the unit, maintenance of air rate at the optimum value, available temperature of air, heating load carryable, equalization of temperature in the various sections are useful results obtained from operating studies of the equipment.

The results indicate that there are good future possibilities for utilization of this solar heating principle, and that further work to develop the apparatus commercially marketable units is justified. Indications are that the owner of a moderate-size house could feasibly have solar equipment installed which would save two-thirds of his winter fuel bill in a climate having considerable winter sunshine, but rather large heating requirements. The relatively low cost and simplicity of construction of the equipment are probably its greatest advantages; and, since the efficiencies are comparable to those secured with flat-plate collectors heating water, and much greater than those obtained with simple large south windows, it is felt that commercial development may be possible as soon as the few remaining problems have been solved.

It is to be realized that all data, calculations, and results have been made at one location—Boulder, Colorado—40 degrees 0 minutes north latitude, 105 degrees 16 minutes west longitude, 5,428 feet elevation. All the results in general —and those of the house operation in particular—cannot be applied to other locations without discretion. Certain generalizations, however, can be made. Thus, in locations in which the solar radiation received is greater than in Boulder (because of lower latitude, for example) or heating equipment is less (because of higher winter temperature), either the fraction of the heating load carryable by a solar unit of the same size would be greater in the other location, or a collector to carry the same load could be smaller or tilted at a lower angle. For prediction of size of collector needed to carry a certain heating load in another location, data on latitude, solar radiation, winter temperatures, and house-heating requirements are necessary.

Results obtained with the collector alone, as in the case of the laboratory runs, can be applied more readily to other locations; and comparable performance can be expected if consideration is given to the different angle at which the sun strikes the collector at the different latitude. Thus, for the same projected area of collector, and equivalent cloudiness, heat-recovery efficiencies should be very similar at the same air rates, even in widely different locations.

It is probable that, although the conditions for utilizing solar energy at Boulder, Colorado, are considered to be good, they are close to the severity beyond

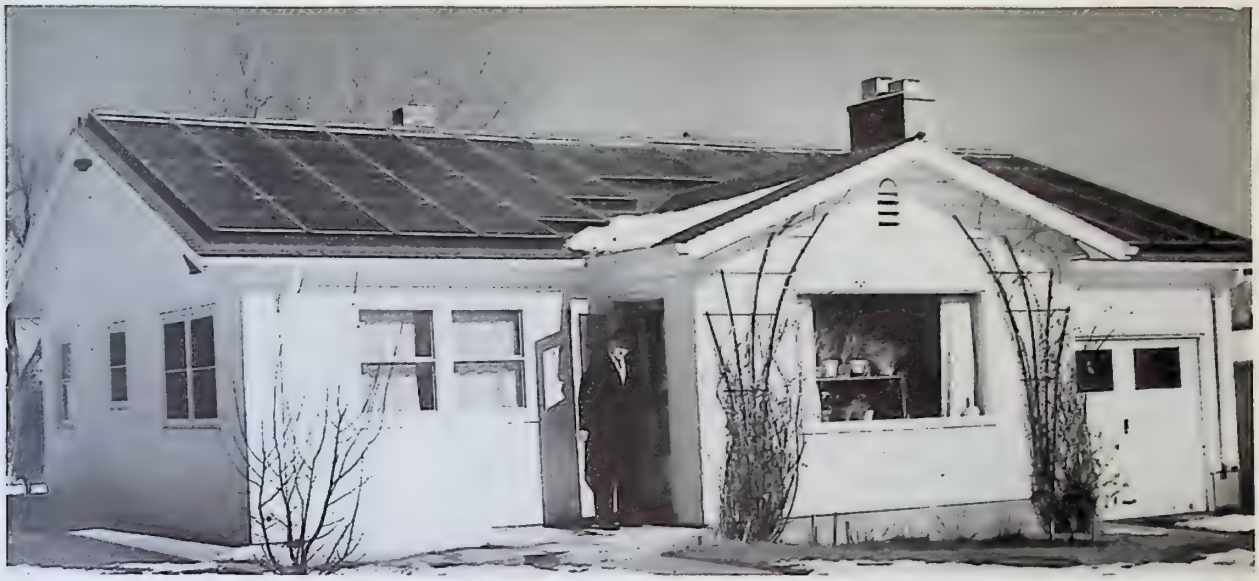


FIGURE 5—In the house unit it was found desirable to prevent breakage during the hail season by covering the solar heat collecting unit with a galvanized iron screen with ½-inch openings. It was found, on the other hand, that no protection from snow was necessary, since the tilt of the roof and the smoothness of the glass allowed the snow to slide off readily. The results indicate that solar energy can be used to heat air temperatures in excess of 200 degrees and that over-all heat recovery efficiencies of at least 35 percent of total can be secured without difficulty.

which it would be uneconomical to attempt solar heating. It is, therefore, felt that, in locations north of the fortieth parallel, the cost of heating houses by solar radiation would generally be too high for economical application of this principle. Collector and storage units would have to be unduly large and their cost would be a considerable drawback. It is possible, however, in a few northern localities, where considerable winter sunshine is obtained and where temperatures are not extremely low, economical use might extend considerably above the fortieth parallel. This would be particularly true where fuel is expensive. As further explained below, the greatest application of this solar energy collector should be in the southern portion of the United States.

Certain considerations of the other uses of the collected solar energy have also been made.

The first of these involves the possibility of using the heated air to operate an absorption type of refrigeration air conditioner. Such a unit is available commercially, and the application of solar energy to its operation is considered to have excellent possibilities. It is apparent that the period in which the greatest energy is received corresponds exactly to that period in which the greatest cooling is required. The apparatus would, therefore, be able to provide the most cooling at the time it is needed.

It is felt that, perhaps, the region of greatest applicability of this equipment is in the southern half of the United States, where winter heating loads are not too severe and where summer cooling is greatly desired.

The heating of water for household uses has also been considered, and equipment for this purpose has been installed in the house unit. No complete results of its operation are available, because of its late installation, but a few observations show that, particularly in the summer, it should be possible by using solar-heated air to heat sufficient water to the temperature required for household use.

Other possible uses for solar energy might be to provide a continuous supply of clean, heated air or other gas to certain industrial processes — such as drying or crystallizing.

Numerous factors have not as yet been investigated because of certain limitations. The most important of these problems is that of heat storage. Most of the envisioned uses for the solar energy recoverable by this process are predicated on the assumption that storage of the heat for at least 24 hours can be successfully and economically provided. This problem has not yet been investigated experimentally, because it was considered beyond the scope of the study covered by this report. It is expected, however, that studies now being planned will show that storage of heat can be accomplished satisfactorily. On this assumption, result of heat storage calculations have been included in this report. They indicate that storage of heat only overnight in a bed of crushed solid, will more than double the heating load carryable by the solar unit, and will not require a storage unit too large for practical use. An additional benefit, not yet determined quantitatively, is the higher storage temperatures which can undoubtedly be obtained when the hot air is recirculated between the collector and the storage unit. Recently a fully automatic system, involving a storage bed, was installed in the house of Doctor Löf, with promising results.

An important practical problem, not early solved because of the lack of time, is the discovery of the fundamental cause of, and the method of eliminating, the excessive breakage of glass in the collecting unit. The frequent breakage of plates exposed to sunlight is no doubt caused by thermal stresses set up in the glass, but the way in which these stresses cause breakage is not definitely known. Tests conducted, which have practically eliminated the trouble, indicate that small edge cracks grow into large ones, rather than the lack of proper annealing or some other cause.

Although considerable progress has been made toward designing a collector entirely practical for the average home, more work needs to be done to make possible the large scale production of units which then can be easily installed in the house. Certain simplification and standardization in design is a necessity before wide usage can be realized.

Another subject meriting study is the possible use of glass which has been surface-treated to reduce reflection. It would, perhaps, be possible, at comparatively low cost, to reduce materially the amount of energy reflected back to the sky from the unit, and thereby increase the efficiency.

The black coating on plates in all the tests was very satisfactory, and a special black glass surface has recently been developed. It had a high absorbtivity for solar radiation and reasonably good adherence. Future work, however, will be directed toward the development of a coating with extremely permanent characteristics and one which could be easily applied at the glass factory.

Weather resistance of the equipment was generally very good. The use of putty for sealing the cover glasses on the house unit proved very satisfactory, except when it was necessary to replace broken glass. In such instances, the hardened putty prevented easy removal of the cover plates. The use of a rubber or felt sealing strip is being contemplated and will be investigated. The house unit was found to withstand a high wind very satisfactorily, but the frames holding the cover glasses on the laboratory unit were blown off and demolished

in the same windstorm. As a result, the type of construction originally used in the laboratory unit has been abandoned.

Snow removal constituted no problem, for the smoothness of the glass caused the snow to slide off the roof as soon as a thin layer next to the glass had melted. The ¼-inch-mesh screen (hardware cloth) was considered adequate protection against hail damage in the summer and was used only in that season.

Ideally, a very thorough study of numerous fundamental problems should have proceeded, or, at least, accompanied, the designing and testing of the whole solar collector. The limits of time, personnel, and funds prevented this. However, E. R. Irish has recently directed studies toward learning the true character of the air flow between the heated plate, whether streamline, turbulent, or eddying, because of thermal gradients, would be extremely valuable in establishing an optimum design. Measurements of air flow and temperature should be made by careful explorations across the cross section of the space between the plates. Further theoretical development of the heat transfer relations should also be made and correlated with the experimental results.

It is hoped that some of these fundamental characteristics of the solar unit can be investigated in a new project, along with the over all factors previously mentioned. With this more complete knowledge, it is felt that the most practical design can be developed and the optimum operating conditions established.

CONCLUSIONS

Fundamental

(1) The principle of solar heat collection which has been theoretically devised by K. W. Miller is workable on a practical scale.

(2) Although performance of the full-scale collector is not as good as theoretically predicted, solar heat can be recovered in the form of hot air, with an over-all efficiency of 35 to 40 percent and an average daily exit air temperature of approximately 110 degrees Fahrenheit.

(3) During periods of high heat input, as in the middle of the day, exit air temperatures of 175 degrees can be secured with an over-all efficiency of 35 to 40 percent.

(4) By reducing the air rate to a comparatively low value, air temperatures of at least 225 degrees can be secured, but at an efficiency reduced below 10 percent.

(5) Heat recovery efficiencies which have been secured are comparable with or greater than those previously obtained by the use of other methods.

(6) The optimum plate arrangement is 2/3 overlap, 1/3 of the top surface coated black, ¼-inch spacing between plates, and cover plates forming a complete enclosure.

(7) The optimum tilt for solar heat collection at 40 degrees latitude, from October through May, is 43 degrees; optimum tilt in other localities is approximately numerically equal to the particular latitude.

(8) Only a small reduction in radiation collected is observed when the tilt is greatly reduced; a tilt of 27 degrees at 40 degrees latitude permits the collection of nearly 92 percent as much heat as a unit of the same size would collect at a 43-degree tilt.

(9) A collector tilt of 47 degrees is the optimum at 40 degrees latitude for winter heating of a house having a collector area and heating requirements similar to the experimental house and having a unit storing heat for one day; optimum tilt in other latitudes would be be the latitude plus approximately 7 degrees.

(10) As long as the problem of plate breakage remains unsolved, practical application of the equipment cannot be made.

(11) The immediate cause of plate breaking is thermal stress resulting from unequal heating of the plates; the manner in which thermal stress initiates breakage is unknown.

Secondary

(1) Air flow through the unit is not streamline as predicted by Miller, but eddying because of the high temperature difference between the plates.

(2) The time lag in the outdoor units, because of heat storage in the unit itself, is between 1 hour and 1½ hours.

(3) In the collector tested, 1 cubic foot of air supplied a minute for each square foot of collector results in a heat collecting efficiency of about 35 percent, if the atmosphere is reasonably clear.

(4) Any decrease in solar input—such as that caused by clouds—causes no change in efficiency if the air rate is not altered, but results in a lowered exit air temperature.

(5) Heat recovery efficiency is only slightly affected by changes in entrance air temperatures.

(6) On a clear day, in the test location, solar reflection and heat convection from the cover each constitute about one-third of the losses; radiation from the cover plate and conduction through the sides and bottom of the unit make up the balance of the losses.

House Unit

(1) A solar heat collector of the type herein described can be installed on the roof of a suitable house and employed in conjunction with the standard hot-air heating system to supply a portion of the heat required by the house.

(2) The household solar heating unit can be regulated entirely automatically so that, when heat is required in the house, fuel will be used in the furnace if insufficient solar heat is available.

(3) Although the operating variables have not yet been fully regulated to secure the optimum performance, approximately 20 percent fuel saving has resulted during one winter from the use of a solar heat collector, covering about one-third of the roof, in the one dwelling installation.

(4) Results of the operation of a water heater, utilizing the solar heated air, although based on limited data secured over a short period during which heat insulation was not in use, indicate that the domestic hot water needed during the summer can be supplied from the solar unit.

(5) The construction employed in the house unit is the most practical yet devised and is superior to the construction of the laboratory unit.

(6) The weather resistance of the collector employed in the house installation was good; snow slid from the roof, a screen gave protection from hail in the summer, and high wind caused little damage.

General Indications

(1) Cheap heat storage, although not studied experimentally, can be provided in order to store excess heat collected during the day for use at night.

(2) Use of the solar heat collector without the auxiliary heat storage unit is is probably impractical in most locations.

(3) With proper adjustment and insulation of the experimental house unit, approximately 34 percent of the annual heating load should be carryable by the solar unit alone; with the installation of a heat storage unit of a size adequate for overnight storage of nearly all of the heat collected which is required by the house, the combined collector and storage unit should be able to carry approximately 55 percent of the annual heating load.

(4) A well insulated chamber, containing approximately 6 tons of crushed rock, coke, staggered cinder block, hollow tile, or similar material, would provide heat storage capacity adequate for the requirement set forth above; the dimensions of such a chamber could be roughly 3x3x15 feet.

(5) As an alternative, heat storage in the form of heated water could be provided.

(6) The advantage in providing sufficient storage material to store heat for two or three days is slight and is probably more than offset by the increased cost of the larger storage unit.

(7) When heat is not being supplied to the house, the recirculation of air from solar heat collector to the storage unit and back to the collector would be advisable, because this procedure would permit higher storage temperatures and greater heat storage to the unit weight of storage material.

(8) Heat recovery efficiency should not be appreciably different in widely separated localities, provided that the same air rates are employed and the same area of collector is presented normal to the sun's mean position at the particular latitude.

(9) In general, locations in which greater winter sunshine or lower heating loads prevail (as in most sections further south than Boulder), greater fuel savings will result if collector and storage sizes are made the same as herein described; for the same savings the units can be smaller.

(10) Economic advantages of installations north of the fortieth parallel of latitude are doubtful, unless in regions of unusually favorable weather conditions or high fuel costs.

(11) The applicability of the solar heated air as the energy source in the operation of an absorption refrigerator type of air conditioner is possible; air cooling should thus be cheaply obtained in the regions where most needed.

(12) The cost of a complete solar heating installation under the conditions encountered in the experimental units should, on a large production basis, be within the economic feasibility of a small home owner.

Sidewalk Heating Prevents Ice Formation

Patron Safety and Good Will Are Promoted Through a Low-Temperature Heating System

The winter's snow, ice, and sleet poses no sidewalk cleaning problems for Edward J. Modie, Barnesville, Ohio, theatre owner.

The sidewalk in front of his two theatres in the eastern Ohio community, a few miles west of Wheeling, West Virginia, has been transformed into a large, low-temperature, heating unit which melts snow as quickly as it falls, prevents ice from forming and eliminates all snow shoveling and the use of chemicals.

Modie used to have a crew of ushers with mops in the lobbies of the Ohio and State theatres to clean up slush and water tracked in by patrons. Then he heard about automatic snow melting systems and became the first theatre proprietor in America to install one.

Even in the worst snowstorm last winter, his sidewalks remained dry and free from snow and ice. Patrons did not have to trudge through drifts or risk a spill on an icy sidewalk to reach the ticket windows of the show houses which are situated only a short distance apart on the main street of the Ohio town.

Modie reports that his snow-free, ice-free sidewalks have gained for him considerable goodwill among the citizenry of Barnesville, because the local ration board office—where, at one time or another, virtually everyone in town pays a visit—is located between the two theatres and within the sidewalk heating zone.

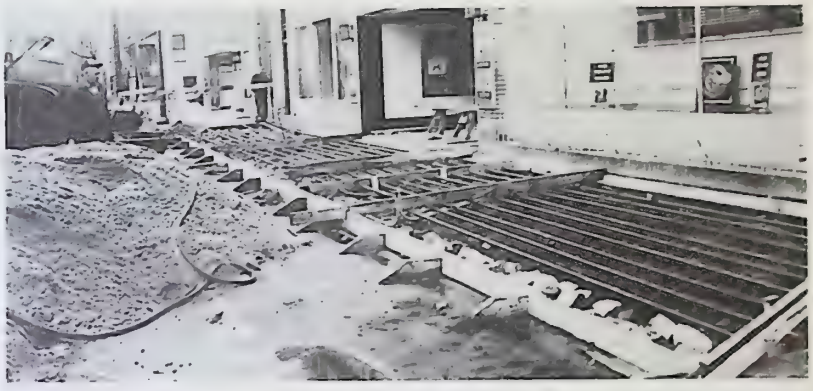
Any good plumbing or heating contractor can install an automatic snow melting system. It is not a gadget. It merely is a principle of heat engineering, like the principles involved in ordinary heating systems.

To install the system, the 120-foot sidewalk in front of the theatre was torn up. Then wrought iron pipe—used because it resists corrosion—was shaped into coils, positioned over the gravel fill the full length of the walk and embedded in concrete that formed the new sidewalk. Coils are suspended in the concrete so that they are approximately 2½ inches from the surface. The concrete is 6 to 8 inches thick.

In this adaptation of the principle of radiant heating, wrought iron pipe is generally used because its coefficient of expansion is that of the concrete, which eliminates the chance of cracking due to unequal expansion rates.

During winter, the system is kept in continuous operation. A small circulator pump forces hot water from the automatic gas heater in the theatre basement through the coils and the concrete is warmed just enough to melt any snow that may fall. Residual water evaporates quickly. Ice does not form. Modie declares that the sidewalk becomes dry in short order after a rainfall.

Water temperature in the system is kept about 95 to 100 degrees Fahrenheit by an aquastat on the return main that automatically increases the flame of the boiler when the water drops below required temperature. To protect the system against freezing when it is not in operation, anti-freeze solution has been added to the water.



INSTALLING WROUGHT IRON PIPE COILS for a snow-removal system in front of the Ohio and State Theatres, Barnesville, Ohio, is shown in this picture from the A. M. Byers Company. Edward J. Modie, owner of both theatres, reports that the system keeps the sidewalks free from snow, ice, and sleet. Such an installation as this resembles a radiant heating system operated at a low temperature level.

Although Modie is thought to have been the first theatre manager to install such a snow removal arrangement, his is not the first such system, since several department stores, industrial plants and private residences have similar sidewalk and driveway installations. The potentialities of these systems are vast. Hospitals, churches, schools and similar institutions are studying the advantages of removing snow without costly shoveling or the use of chemicals from sidewalks, steps, and driveways.

Airport officials envision the utilization of underground snow melting systems to keep runways and taxi strips open and clear. The funds spent by airfield managements throughout the country in one season for equipment and labor to remove snow is a staggering figure. One airport alone has over $100,000 invested in equipment like plows and tractors. But even with such equipment, manual attempts at removing snow to keep runways clear sometimes are futile for the snow piles up so fast that by the time one section is cleared, another is blocked. And then ice forms to introduce a very serious hazard to take-offs and landings.

Cost of installing these unique systems is nominal compared to the expense of manually removing snow. Operation costs are considered to be very low. A Pittsburgh engineer who installed heating pipes in his driveway reports that it cost him only 60 cents to remove 15 inches of snow from about 400 square feet of surface.

THE 120-FOOT LONG SIDEWALK in front of the two theatres in an eastern Ohio community has been turned into a heating unit which melts snow and keeps the pavement dry and clear. Wrought iron heating pipes were embedded in the concrete before it was poured. Wrought iron is used because the coefficient of expansion is the same as that of concrete, eliminating cracking. (Byers' photo.)



Powder-Fine Coal for Heating and Power

Small-Scale Heating Applications May Come From Research on Gas Turbine Locomotives

HOWARD J. CARSWELL
Bituminous Coal Institute

Aspects of pulverized coal technology currently attracting attention are the gas turbine locomotive to burn powder-fine coal, its corollary potentialities in stationary and marine power, and possible adaption of its coal-operational method to small commercial and home-heating installations. Immediate interest today is in the coal-fired gas turbine railroad locomotive because the nearly $3,000,000 developmental program has railroad-coal sponsorship, but the coal "atomizing" and fly ash removal technique is regarded as having a broader significance.

Another development of current interest is the new method of burning crushed coal in a horizontal cyclone burner, as tested in the Calumet Station of the Commonwealth Edison Company of Chicago. An outstanding feature of this burner is its ability to burn crushed, low-grade coal having a low fusion-point ash, with the removal of 80 per cent and more of the ash in molten form as slag tapped from the bottom of the furnace. This enables cleaner stack gases, meeting the fly ash problem and thus abating the smoke nuisance in deference to city air polution ordinances. Its foremost field of usefulness, at least at this time, is in the big electric generating stations, although later it may prove of value in smaller industrial power plants. It was described at the December, 1946, annual meeting of the American Society of Mechanical Engineers by L. S. Wilcoxon, vice-president of the Babcock and Wilcox Company; A. E. Grunert, of Commonwealth Edison Company, and Ludwig Skog, of Sargent & Lundy, Chicago.

In the autum of 1944, an installation began operating, involving a steam generation unit of 150,000 to 180,000 pound steam capacity per hour at the Calumet Station of Commonwealth Edison Company.

The performance of this horizontal cyclone burner proved the principles involved to be sound, providing a simple, reliable and efficient means of burning coals at low burning temperatures to take care of high-ash, low fusion temperature coals.

The Calumet Station cyclone burner installation, arranged for natural circulation, is 8 feet in diameter and 11 feet long. It has a primary-air and coal-inlet port on the front end, a secondary air-port section along the upper burner periphery, and an outlet throat section at the discharge end. A continucus slag-tap opening is at the bottom. Whether horizontal or vertical, the cyclone burner is not limited to new installations but is applicable to existing units. It is not necessarily a universal burner.

The Calumet Station installation added a second, vertical burner, which is fired tangentially at the top.

So successful has been Commonwealth Edison's experience with the Calumet installation that it plans to install a similar cyclone burner in its Fisk station for the 150,000-kilowatt turbo-generator that will go into service in 1949.

Reporting this development the Chicago Journal of Commerce set forth the advantages claimed for the Babcox and Wilcox cyclone burner: (1) between 80 and 85 percent of the coal ash is collected in the furnace itself and removed in molten form, simplifying ash handling and reducing the emission of dust through stacks; (2) this ash retention also reduces the amount of necessary boiler tube cleaning, permitting the closer spacing of the tubes; (3) costly precipitator equipment used in conventional installations to remove fly ash is not needed; and (4) the new furnace uses simple, easily maintained coal-crushing equipment in place of expensive pulverizers.

GAS TURBINE METHOD

As for the gas turbine to burn powder-fine coal, a large scale pilot plant began operating early in 1947 at Dunkirk, New York. This set-up has demonstrated the feasibility of burning powder-fine coal in the gas turbine. Continuous 24-hour run-testing proved satisfactory. During the summer of 1947 full-scale combustion-operational tests were underway at the Kaiser steel plant at Fontana, California with Northrop-Hendy Company cooperating with the Locomotive Development Committee of Bituminous Coal Research, Inc. The blast-furnace blowers provide air in the great amounts required for full-scale testing of coal burning and ash removal.

As to coal handling, the system devised for locomotives and equally applicable to stationary and marine purposes is an automatic one of crushing, drying, and pulverizing for delivery into the combustor (air heater).

The gas turbine has three basic parts: compressor, combustor (air heater), and turbine. Atmospheric air is compressed to a moderate pressure, and is heated to at least 700° Fahrenheit by burning the powder-fine coal directly in the air. As the air temperature rises above 700 degrees Fahrenheit, the air going through the turbine produces not only enough power to drive the compressor but it also gives useful work to the output shaft. At temperatures as hot as 1,300 degrees Fahrenheit, which are safe with today's metal alloys, its thermal efficiency can get as high as 25 per cent and the output from a single turbine can be more than 4,000 H.P.

Although the thermal efficiency is less than that of the Diesel, the operating cost using coal should be only one-third as much as the Diesel's. It is significant that coal is not only abundantly available, but it supplies heat energy at a much lower cost than presently available from fuel oils.

The coal is transported from the bunker by a screw feeder similar to a conventional stoker, and then crushed and dried by exhaust heat from the turbine. The coal coming out of the crusher is about as coarse as percolator-grind coffee. At this stage it enters a chamber where the pressure is about 150 pounds per square inch. A coal pump does the pressurizing.

It is then fed from the pressurized storage tank as needed, and picked up by a stream of rapidly flowing compressed air which speeds it into the "coal atomizer." In this simple device, coal particles pass with compressed air through a nozzle where the pressure drops from 150 down to 75 pounds per square inch causing the coal particles to shatter into extremely fine fragments. These particles burn in suspension in the combustor, and leave minute bits of ash, which must be removed before the air is allowed to pass into the turbine.

So the dust-laden, hot air is put through a battery of small cyclone separators, such as those made by the Aerotec Company and the Thermix Engineering Company. This removes as much as 95 per cent of the fly ash, and elaborate investigation has shown that the remaining ultra-fine particles will not damage the turbine blades. The disposal of this trapped fly-ash is a minor problem.

To summarize, the ability of the coal-fired gas turbine to burn coal is an outstanding virtue. The gas turbine requires no water, which makes it a "natural" for marine as well as railroad usage and for stationary power purposes in arid or semi-arid regions. It is simple and compact. It can produce much more power in the winter than in summer, because less energy is needed to supply the compressor when the outside air is cold. Lubrication costs are negligible. Because it has few moving parts, maintenance should be low. It operates smokelessly.

It is believed that the potential usefulness of the gas turbine, especially the coal-fired, in stationary applications will be in the 1,000 to 2,000 kw. range.

SMALL-SCALE HEATING VENTURE

A powdered-coal heating venture is underway in Baltimore which adapts the coal "atomizing" procedure of the coal-fired gas turbine. In fact, it may be referred to as a "step-child" of it. John I. Yellott, Research Director of the Locomotive Development Committee of Bituminous Coal Research, Inc., has given technical advice to the venture.

The new company is the Heatmasters, Inc. If successful, it points to a great potentiality for bituminous coal in automatic heating for the small commercial,

home, and apartment building heating market.

Whatever large scale success pulverized coal has been for fueling big electric generating stations, its record in residential and small commercial heating has provoked many skeptics. At least several concerted attempts to commercialize powdered coal for home heating have failed, essentially for three reasons: (1) The cost of pulverized coal in small quantities; (2) dirt from leaks in the system, and (3) the annoyance of fly-ash discharged on to surrounding areas. The new system claims to solve these.

The company will manufacture the heating equipment and prepare the powdered coal for retail distribution and use in this equipment. Initially the company will concentrate on installing and servicing commercial customers (as bakeries, theatres, dry cleaning, laundering, hotels, and so forth), that use steam boilers of 75 to 200 HP. This commercial business is expected to provide the new company with a profit-sustaining volume of several thousand tons of coal a year.

That done, the new business venture will seek the multi-family and individual home heating business, serving as a merchant of automatic home heating on an annual heating contract basis.

Under such contracts, the company will install and service the heating units. The tank truck which delivers and fills the air-tight storage hopper by hose (as with fuel oil) will also take away the powdery ash. Heating temperature is regulated by the same thermostatic controls as for oil or gas burners. There is no shoveling nor janitor-type work. Waste gases will be vented off by exhaust pipe or up the chimney, making the operation virtually smokeless. The customer will pay for the installation and for his annual heating service, but not for maintenance and repairs.

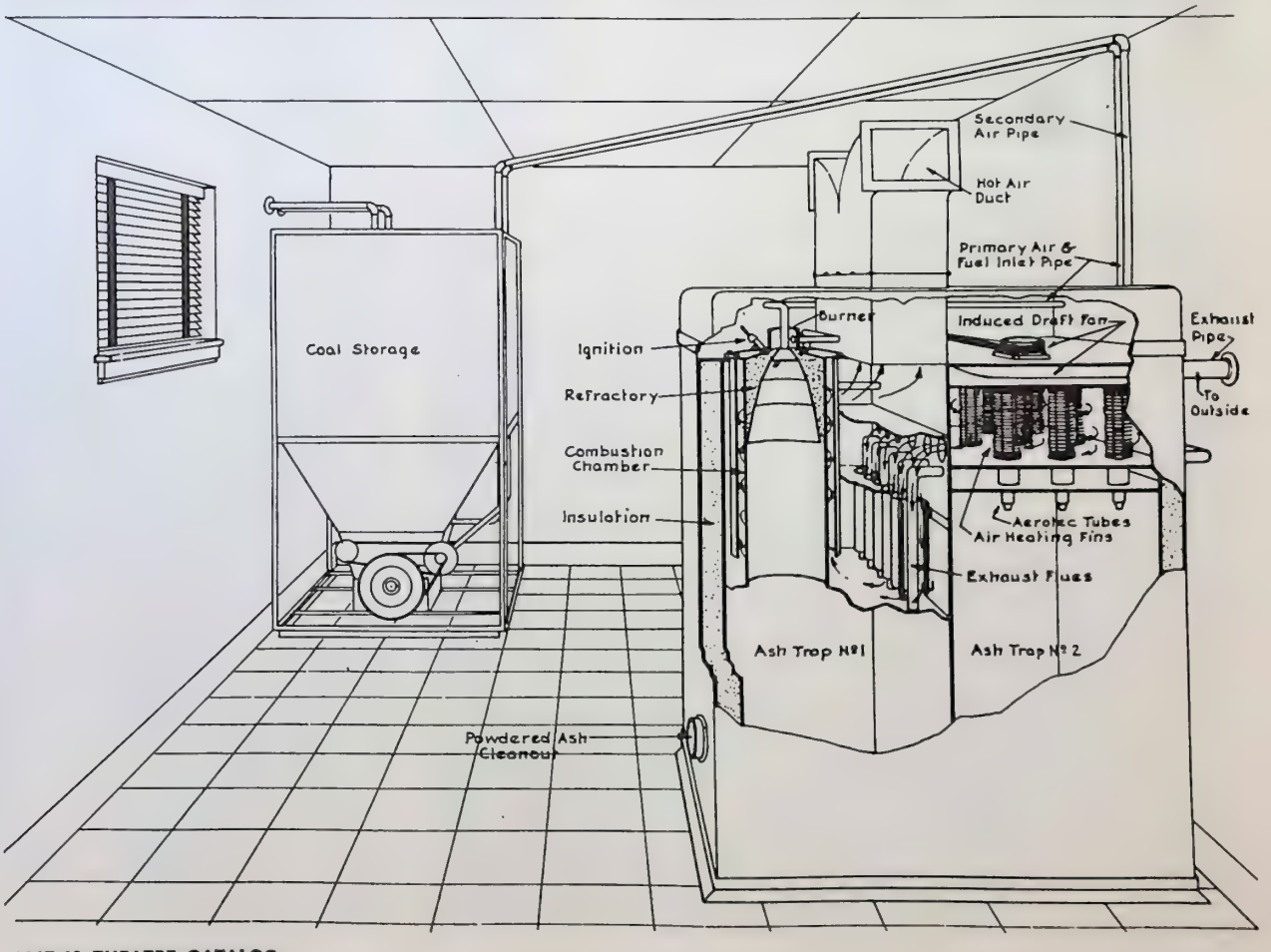
As explained, instead of mechanical pulverization of the bituminous coal the new system will employ the central station air-operated "coal atomizer" technique of such promise in the coal-fired gas turbine. The fly ash will be eliminated by a number of Aerotec tubes, or small cyclone-type separators. The fluffy ash is deposited into an air-tight trap from which the delivery man sucks it out by vacuum cleaner. There is an air pre-heater for recovering waste heat to get higher efficiency.

Of house-size capacity, the unit (although the system is said to be adaptable to existing furnaces) is a vertical sheet metal cylinder lined with refractory. Top-mounting provides for vertical down-firing, after ignition by a gas pilot and sparkplug. A screw conveyor at the bottom of the air-tight hopper brings the powdered coal to the blower for carburetion into the air stream entering the burner. There is a small take-off line from the blower which gusts secondary air into the flaming chamber to assist a more complete combustion.

As to competitive fuel economics, bituminous coal is not only abundantly available but it supplies heating energy at a lower cost than do fuel oils and gas, especially in the East. "Atomizing" at a central station on a quantity scale should permit the company to sell the powdered coal in household lots on a low-cost basis. While the investment and installation cost of the heating system may look high, the customer does no manual shoveling, and the like, and pays nothing directly for maintenance and depreciation. The operating savings should pay for the heating system installation in three years or so, it is contended, while the householder gets clean, simple, smokeless and automatic heating.

As soon as practicable, it is the intention of the company to expand into areas other than Baltimore by establishing subsidiaries or by licensing others to manufacture and distribute equipment, fuel, or both.

THE HEATMASTER UNIT is a sheet metal cylinder lined with refractory. Top mounting provides for vertical down-firing after ignition by a gas jet or sparkplug. A screw conveyor at the bottom of the air-tight hopper brings the powdered coal to the blower for carburetion into the air stream entering the burner. There is a small take off line from the blower which gusts secondary air into the flaming chamber to assist a more complete combustion. As to economics, bituminous coal is not only more abundantly available, but it supplies heat energy at a lower cost than oil and gas.



The Heat Pump for Heating—and Cooling!

Development of Reverse-Cycle Equipments Results in Year-'Round Air Conditioning

CHARLES TATHAM, JR.
Institutional Utility Service, Inc.

It seems quite safe to say that nothing has contributed more to the welfare of mankind, to the advancement of science, and to the development of our present-day civilization, than our modern techniques of producing and utilizing electric energy.*

Until very recently, a last vital service has been largely beyond the scope of electricity for economic reasons of cost. This service is heating, space heating on a sufficiently large scale to warm our houses at a cost competitive with other fuel-burning methods. The promise of this service, however, has now been given and, if our engineering ability and ingenuity live up to their reputation, the promise will be kept.

The answer is the heat pump, an expanded development of the electric refrigeration cycle, which will heat our houses in winter and cool them in the summer. In the fall of 1946 E. N. Kemler, head of the engineering research division of the Southern Research Institute, said, "It is difficult to emphasize the importance of the heat pump to the electric utilities and to the public. To the utilities it offers a potential load far exceeding that from any other source in the home. To the public, it offers for the first time, at a competitive cost, automatic year-round home comfort; that is winter heating and summer cooling with the same equipment, utilizing electricity."

THE UTILITIES' INTERESTS

The reverse refrigeration cycle has, of course, been known for many years. As far back as 1852, Lord Kelvin, the distinguished British physicist and mathematician, who did a lot of work on heat and electricity, proposed a "warming engine," which was nothing more than a mechanical refrigerator in reverse, pumping heat out of the air.

While basically the heat pump is not a new development, its application to house heating on a commercial scale has only recently started. Its ultimate potentialities have a tremendous appeal to the imagination, as evidenced by a recent New York newspaper headline which forecast a 2,000,000-unit market for it over the next several years and went on to describe it as one of the most promising postwar home appliances.

The importance of this potential load to the electric utilities can be quickly indicated. The average annual electric requirement to operate a heat pump during the heating season will range from about 4,000 to 9,000 kilowatt hours, depending on the location and temperature characteristics. Multiply this by 2,000,000 and you get an additional load of from 8 to 18 billion kilowatt hours. This is equal to from 21 per cent to 47 per cent of total domestic kilowatt-hour sales in 1946. And another 4 billion kilowatt hours would be required to operate these heat pumps for cooling during the summer.

This, however, is far from the whole story. It is estimated that in 1940 the total residential consumption of fuel for heating was about 5,038 trillion Btu. Of this amount, the useful heat was estimater at 2,382 trillion Btu., or about 47 per cent, the balance representing heat loss up the chimneys. Translated into equivalent electric energy, this "useful" heat would amount to approximately 700 billion kilowatt hours.

The total residential consumption of electricity in 1940 was only 23.3 billion kilowatt hours, which figure increased to 34.2 billion in 1945. Electric sales for all purposes in the latter year aggregated 193.6 billion kilowatt hours. While it is obvious that the entire residential heating market can never be served electrically, nevertheless there is a very substantial amount of business that the electric utilities could advantageously obtain. The combined winter and summer operation of the heat pump, moreover, provides a load factor that is definitely attractive.

Philip Sporn, executive vice-president of the American Gas and Electric Company, has been one of the principal sponsors of the heat pump development in this country. He and his associates have been working on it for some fifteen years. In June, 1944, he presented a comprehensive paper on the subject before the Edison Electric Institute, in which he said, "There are five principal services that electricity performs in the modern home today: lighting, refrigerating, cooking, water heating and operation of miscellaneous appliances. The sixth, and most important function, more important, in fact, than all other five functions put together—namely, heating—is today still performed non-electrically. It can in most cases be performed electrically by the heat pump.

The electric utility companies, of course, have evinced keen interest in the possibilities of the heat pump. In the summer of 1946, two special meetings were held under the sponsorship of the American Gas and Electric Service Corporation to discuss its development, and more particularly its potentialities, as a residential heating and cooling system.

The first meeting was held in New York in June and was attended by representatives of twenty-three companies. Sporn opened the meeting by saying, "It has been stated that the all-electric home is not possible without the heat pump and I believe the further we get into the problem the more we are convinced that this is so."

H. M. Sawyer, vice-president of American Gas and Electric, pointed out that, if the electric business is to continue to grow, all domestic uses must be actively promoted. The necessity for the industry to meet the competition of gas house heating, with its associated gas cooking, water heating, and refrigeration, would, he felt, be met by the heat pump, with its efficient heating performance and its possibilities for summer cooling.

Representatives of the Connecticut Light and Power Company and the New Jersey Power and Light Company felt that there would be little difficulty in finding customers for the heat pump, even though its potentialities appeared to be more limited than in the southern sections of the country. It was brought out that the heat pump would have considerable value in protecting and gaining other types of load against competitive fuels. Where gas competition is keen, it would help protect the cooking as well as the water-heating load.

A second meeting was held in August in Birmingham, Alabama, and was attended by representatives of twenty-five companies. Thomas Martin, of the Alabama Power Company, opened the meeting, saying, "Your presence here today reflects your own belief that the heat pump as a device for domestic and industrial heating and summer cooling is of great importance to the public and to the electric industry."

S. W. Andrews, rate engineer of the American Gas and Electric, pointed out that "we are pretty well convinced that in years to come, unless we can offer to the builders of new homes electric heating, that our continued growth in the field of selling service to residences is more limited than we like to think." He went on to say, "It is our hope and belief that the initial cost, when the manufacturer gets into production of these units, will not exceed the complete cost of a separate air-conditioning unit plus a separate fuel-fired system."

At this meeting the majority of the companies represented operated in the southern and southwestern states, and the cooling and air-conditioning aspects of the heat pump were stressed. Practically all those attending expressed great interest in the program and promised that their companies would cooperate in every way possible.

As a result of these meetings a specific program was set up under which manufacturing specifications were agreed upon and submitted to various manufacturers. The utility companies pledged themselves to purchase and install several hundred units, and the first deliveries are expected later on this year.

*This article is reprinted from the June 5, 1947, issue of Public Utilities Fortnightly, by special permission of the author and the journal's assistant general manager, J. M. Robertson.

THE HEAT PUMP

As stated, the heat pump is essentially an enlarged application of the ordinary electric refrigerator.

Mechanical Equipment

Expressed in non-technical language, it consists of a closed system through which a refrigerant, such as Freon, is circulated. The main parts of the system consist of an evaporator, where the cold liquid refrigerant absorbs heat from the surrounding space and, in so doing, changes from a liquid to a gas; that is, evaporates. It then passes through a compressor, where the refrigerant, now in gas form, is compressed, which greatly raises its temperature. Then it goes through pipes or tubing to a condenser, where the now very hot gas is condensed back to a liquid state and gives up the heat absorbed in the evaporator plus the additional heat created by compression. The mechanism is run by an electric motor, which drives the compressor, and is automatically controlled by thermostats. The entire unit is enclosed in a suitable cabinet measuring approximately 3 feet wide by 6 feet long and 6 feet high.

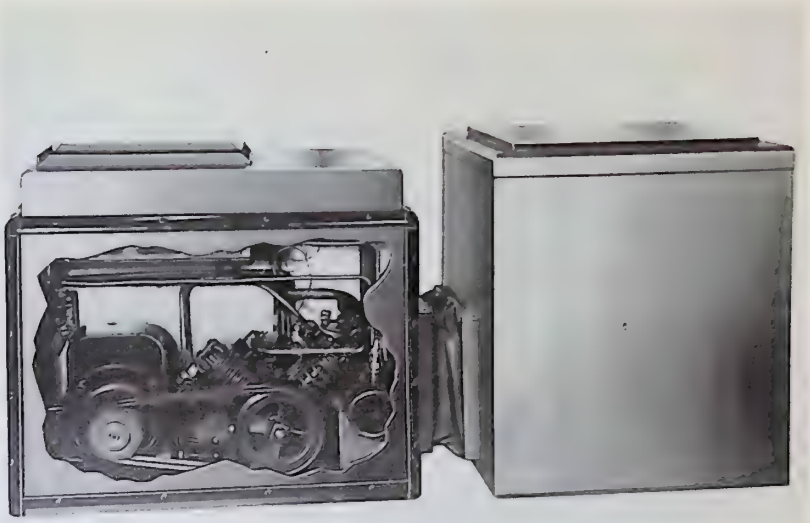
Types of Systems

It is obvious, of course, that there must be some exterior source of heat that can be constantly drawn on. This source of heat is in the outside air, in bodies of water, such as lakes or rivers, in ground water, such as wells, and in the earth itself. Two basic types of heat pumps have been developed, one which absorbs heat from the outside atmosphere, called an air-to-air unit, and one which obtains heat from the ground, or from ground water, called a ground or water-to-air design.

Air-to-Air Systems—The application of the air-to-air system lends itself most satisfactorily to locations where the outside temperatures does not fall much below 40 degrees; that is in the southwest and southern areas of the country. In this type of unit, air is drawn in from outside the house, passed over the evaporator where it gives up a certain number of Btu's of heat, and is expelled outside again at a reduced temperature. The cycle is constant (while the heat pump is in operation) and consequently a great many Btu's of heat are obtained. For example, even when air is at a temperature of 0 degrees it contains 73 Btu. of heat in every pound.

Ground-to-Air Systems—In the ground-to-air design, one method is to bury a coil of copper, or other suitable metal tubing, in the earth outside the house. The refrigerant is circulated through this tubing, absorbing ground heat, and then it passes through the compressor in the heat pump located in the cellar, and on through the cycle described above. Another method is to circulate water through a closed pipe sunk deep in the ground. The water absorbs ground heat which in turn is passed on to the refrigerant in the heat pump.

The ground-to-air job appears particularly suited to the colder sections of the country, since ground temperatures range from 40 to 50 degrees even in the northern part of the country, and vary within a range of only 1 or 2 degrees from season to season.

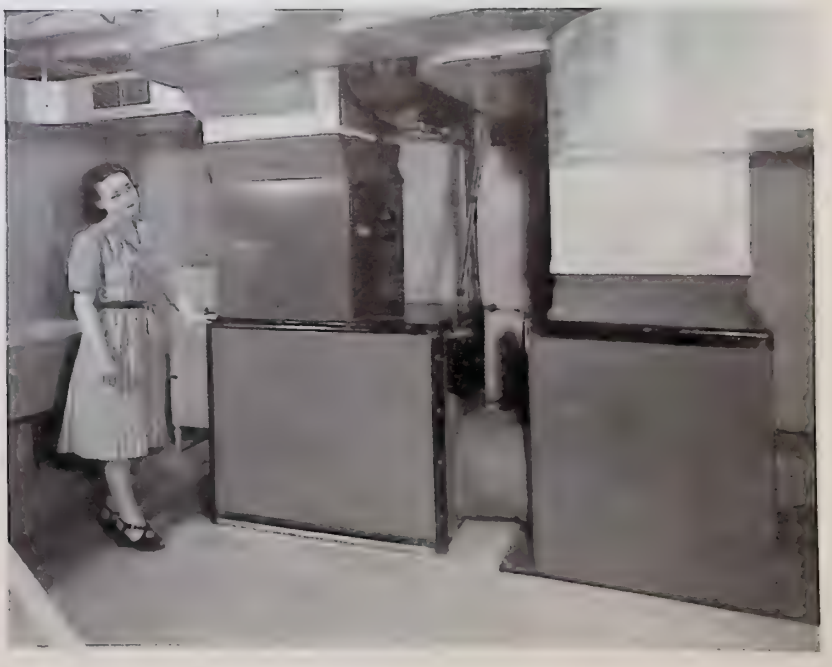


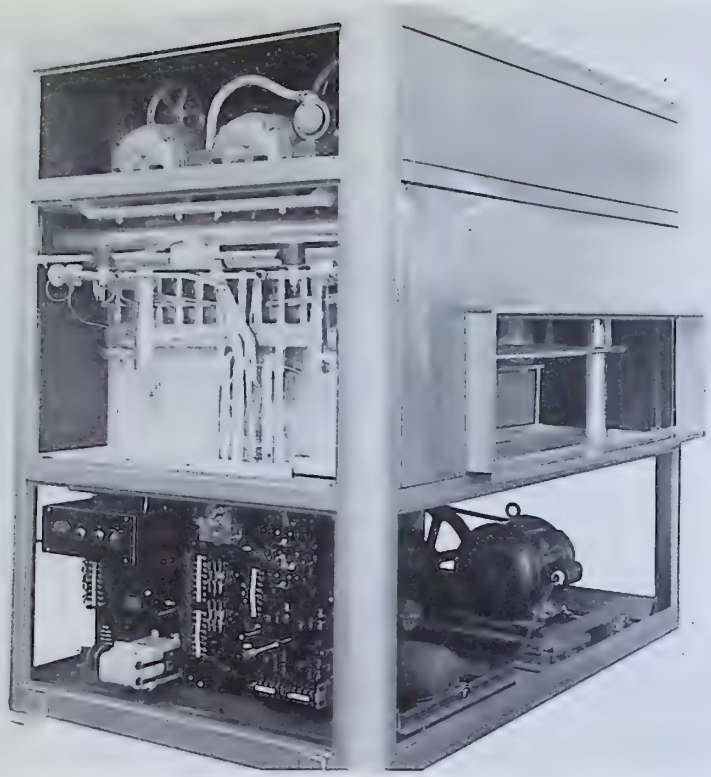
THE MARVAIR is a ground-to-air system, utilizing the heat stored in the earth, obtained by pumping water through submerged piping. A closed U-shaped pipe circuit is enclosed in a 4- to 5-inch bore sunk some 200 feet into the ground below the operating water line. Picture, courtesy of Muncie Gear Works, shows a cut-away view of the compressor side of the unit. Pump is in the right-hand side.

(In Switzerland, a number of water-to-water heat pumps have been in successful operation for many years, where large supplies of lake water are available as a source of heat, and other fuel costs are relatively high.)

In both systems, heat is transferred from the condenser to the interior air, which is circulated through the house in the usual manner. In summer, for cooling purposes, the heat pump automatically reverses itself and absorbs heat from the air within the house, expelling it outdoors. The heat pump can also be operated in conjunction with a hot-water heating system although this would not

INSTALLED IN A HOME, the Marvair unit is shown in association with the air ducts. In one such installation the total electric input for a heating season was 8,825 kilowatt hours to keep the place at 78 degrees night and day. Installation costs approximated $1,650 for the 3-hp. unit or $2,350 for the 5-hp. one, both figures including the well installation. (Photo courtesy Muncie Gear Works.)





THE AIRTOPIA MODEL 500 is seen (above) with the panels removed to show the blower, motors, coil heaters, electric panel, and compressor motors. In the other picture (below) the same Model 500 shows fans at the top, with the coil and desuperheat coil with humidifier just below. The compressor is shown at the bottom. Motor does not show. Airtopia units are manufactured by Drayer-Hanson, Inc.



give the summer cooling effect. In this connection, the use of radiant heating, with relatively low temperature hot water flowing through pipes laid in the floor, or baseboard molding ducts, would appear to have interesting possibilities.

Operational Costs

Electric space heaters, of course, have long been familiar. These units involve resistance heating, which requires a great deal of electric energy flowing through the coil. Under present costs of delivering electricity to our homes, they are expensive to operate; for the amount of heat delivered they cannot begin to compete with coal or oil, or even gas.

The heat pump, however, overcomes the cost handicap of straight electric heating. It does this by having what is known as a "coefficient of performance" of from 3 to 5. This means that it delivers from 3 to 5 times as much heat energy as it requires in the form of electric energy for its operation. This is based on the fact that the electric energy used in the heat pump's operation is itself given up in the form of heat and, at the same time, a large amount of additional heat is obtained from the outside source, the air, ground water, or the earth.

This characteristic of the heat pump is what gives it its basic competitive advantage. Sporn estimated that an average well-built, 6-room house in the vicinity of Pittsburgh, in a typical year, would require approximately 8,900 kilowatt hours for heating and about 2,000 kilowatt hours for cooling in the summer. At a rate of 1½ cents a kilowatt hour, this would mean a winter's heating bill of about $135 and a cost of about $30 for cooling in the hot months.

In the fall of 1946, A. C. Crandall, vice-president of Indianapolis Power and Light Company, reported that in a test conducted during the 1945-46 heating season, in a 5-room house in Indianapolis, a heat pump installation consumed 6,357 kilowatt hours, of which 6,013 kilowatt hours were used by the motor driving the compressor, and 344 kilowatt hours by the blower fan.

COMMERCIAL EQUIPMENT

There are at the present time at least three concerns manufacturing heat pumps on a commercial basis.

Marvair

The Muncie Gear Works, Inc., of Muncie, Indiana, is turning out a unit under the trade name Marvair. M. M. Smith, vice-president of the company, recently told the writer that they have had Marvairs operating in Muncie for three seasons. One of these units has been in a private home and the total electric input per heating season was 8,825 kilowatt hours. The total degree days for this area at 65 was 5,278. However, he pointed out that the home was maintained at 78 degrees night and day, which would make the degree days as applied to home temperature come to 6,318. The Btu. load of this home was approximately 50,000 Btu. an hour loss at zero, and from these figures he said that their formula of operation cost was one kilowatt hour per degree day of 40,000 Btu. load.

The Marvair is a ground-to-air utiliz-

ing the heat stored in the earth, obtained by pumping water through submerged piping. A closed U-shaped pipe circuit is enclosed in a 4- to 5-inch bore sunk some 200 feet in the ground below the operating later line. Since no water is pumped from the ground, there is no effect on the water level and there is no water to be disposed of.

The Muncie Gear Works plans to produce 10,000 Marvair units this year and hopes to step up production to 50,000 units in 1948. Mr. Smith, who designed the units, said that recent installation costs were approximately $1,650 for a 3-hp. unit, and $2,300 for a 5-hp. job, including the well installation. He believed that future installations could be made as low as $1,000, and said that they were planning on a mass production of Marvairs for small homes which he thought could be installed for as low as $600, exclusive of the ground heat exchanger.

Last fall the electric power board of Chattanooga installed five Marvair units in homes of that city. C. B. Osborne, sales manager of the board, informed the writer that he estimated that the kilowatt-hour consumption of the 3-hp. unit in his own residence would be under 5,000 kilowatt hours for a heating season. His house is a six-room brick construction with an hourly heat loss of 66,000 Btu.

Airtopia

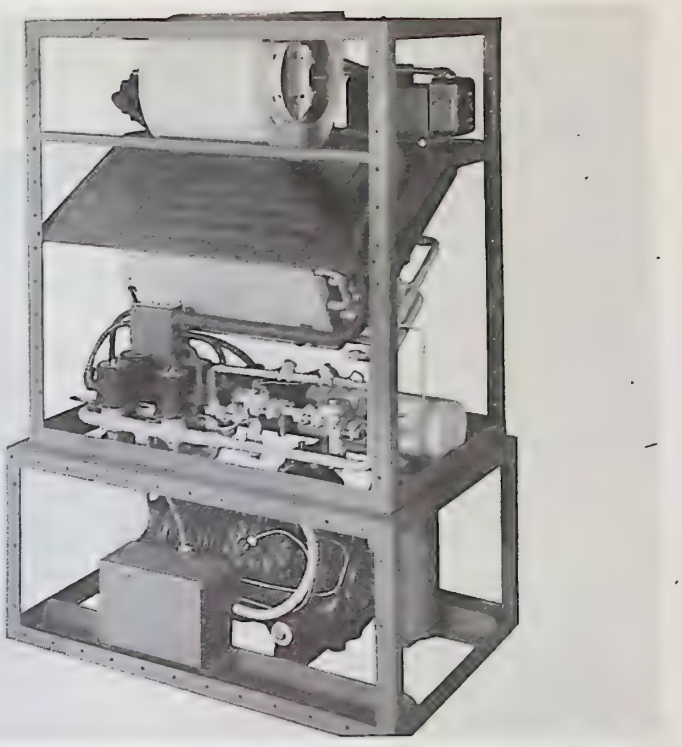
Heat pumps have been manufactured on a production-line basis by Drayer-Hanson, Inc., of Los Angeles, since March, 1946, and it has more than 200 units installed and in operation.

The company's first reverse cycle installation was completed in 1938 for the Southern California Edison Company, and it has given good service ever since. Its product is called the Airtopia, and it is described as a fully automatic air-conditioning machine for all-year use. The Airtopia operates on the air-to-air principle; it obtains heat from the outside air when heating is required, and dissipates heat to the outside air when cooling is required.

In December, 1946, the company reported that the retail prices of the four sizes of Airtopia units being produced were $2,100, $2,700, $3,800, and $4,850, respectively, plus freight charges from the factory, and plus the charges for duct work where required. The smallest size is for heating and cooling of small private homes and apartments up to six or seven rooms, for office suites and small stores. The larger units are for applications requiring greater capacity.

The operating cost of the Airtopia for heating purposes is approximately equal to the cost of conventional coal, oil or gas-fired furnaces, where the cost of electricity is 1½ cents a kilowatt hour as compared to coal at $14 a ton, oil at 9 cents a gallon, and natural gas at 70 cents a thousand cubic feet.

The company has also developed a unit similar to the Airtopia which uses water as the medium of obtaining and dissipating heat for use in colder climates where the outside temperature falls below 10 degrees. The company recently informed the writer that its production schedule for 1947 called for approximately 1,200 units of the air-to-air design and a similar number of units of the water-to-air design.



TERRA TEMP UNIT with cabinet removed shows, from top to bottom, blower and motor, thermostat-controlled switching motor, unit coil which supplies heating or cooling to the air, transfer valve assembly for reversing flow of refrigerant (with receiver tank in rear) and, in the bottom cabinet, the semi-hermetic compressor. Favorable response has attained in tests by Terra Temp Company, Inc.

Terra Temp

The Terra Temp Company, of Indianapolis, is manufacturing a heat pump which has responded favorably to the most severe tests. It operates with a ground coil through which the refrigerant circulates, absorbing heat from the earth. The company claims that where the electric rate is one cent per kilowatt hour, Terra Temp operation compares with heating with coal at $10 a ton, and with 1½-cent electricity it compares with $15 coal.

BROADER IMPLICATIONS

The broader implications of the heat pump provide a fascinating field for speculation. Essentially, it means an efficient utilization of the greatest, most inexhaustible source of heat that is available to us, the sun. How long can we afford to go on burning up our coal and oil and natural gas resources? The supply is not unlimited and it is not being replaced. Our known oil reserves are diminishing. In a recent report on natural gas reserves, the Federal Power Commission stated, "The presently known or proved gas reserves are at an all-time high . . . . This does not mean, however, that gas reserves are unlimited or that discoveries may be counted upon for a long period to equal or exceed going or increasing rates of production. It is an accepted fact that natural gas is a wasting asset and that for every pool discovered, there is one less to be found."

Both gas and coal are becoming increasingly important as raw materials to be utilized in making motor fuels and synthetic chemicals. And the demand for motor fuels and the importance of synthetic chemicals will, without question, continue to grow at an accelerated rate.

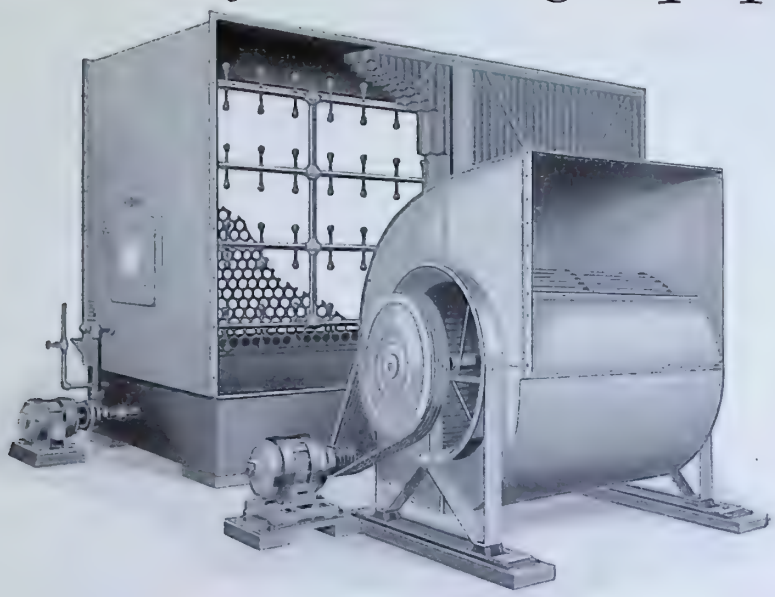
It appears entirely safe to predict the successful application of atomic fission in our central-station electric-generating plants. This will mean unlimited production of electricity without consuming wasting assets. The utilization of this electricity, together with the virtually limitless resources of solar heat, appears, from a long-range economic standpoint, to be a "natural."

This is quite apart from the tremendous stride forward in living conditions that the heat pump offers. As Doctor Kemler says, "The heat pump offers a type of heating that is not otherwise generally available, that is, combustionless heat. The complete elimination of combustion with all its unsatisfactory characteristics such as dust, dirt, smoke, explosion, and fire hazards, make the heat pump an unusually attractive type of heating for the home, as well as for commercial establishments."

Although all the problems are not yet solved, and further research and experimentation must be carried on, nevertheless it appears that the heat pump has come of age.

The development of this improvement in house heating by the electric utilities of the country is an outstanding example of private capital's constant interest in raising the standard of material well-being.

National Comfort Cooling Equipment



SELECTION CHART

FAN—CLASS I THEATRE AIR WASHER—SPRAY PUMP AND MOTOR COMBINATIONS

SYSTEM	FAN DATA							AIR WASHER DATA			SPRAY SYSTEM AND PUMP DATA									
						Motor					For Lowering the Dry Bulb Temperature of the Entering Air 60% of the (†) Wet Bulb Depression.					For Lowering the Dry Bulb Temperature of the Entering Air 70% of the (†) Wet Bulb Depression.				
C.F.M.	Fan Size	O.V.	* R.P.	RPM	BHP	HP	RPM	Size Washer Class I	Number of Nozzles	Free Area Sq. Ft.	G.P.M.	Head in Feet	Size Pump	Pump RPM	Pump Motor	G.P.M.	Head in Feet	Pump Size	Pump RPM	Pump Motor
11000	100	2000	.44	348	1.93	3	1750	101	60	35.75	60	40	1½x1½	1740	1½	70	45	1½x1½	1740	1½
17000	101	2000	.62	309	3.56	5	1750	101	60	35.75	65	45	1½x1½	1740	1½	75	55	1½x1½	1740	1½
20000	105	1370	.75	235	4.02	5	1150	101	60	35.75	70	50	1½x1½	1740	2	84	65	2x2	1740	2
25000	105	1715	.51	209	4.20	5	1150	105 A or B	96	62.4	96	40	2x2	1740	2	112	45	2x2	1740	3
30000	105	2050	.62	234	6.60	7½	1150	105 A or B	96	62.4	104	45	2x2	1740	2	130	60	2x2	1740	3
35000	108	1600	.76	195	7.20	7½	1150	105 A or B	96	62.4	110	50	2x2	1740	3	138	70	2½x2	1740	5
40000	108	1830	.55	178	7.40	7½	1150	108	144	93.5	150	45	2x2	1740	3	175	60	2½x2	1740	5
45000	108	2060	.62	194	9.82	10	1150	108	144	93.5	162	50	2x2	1740	3	202	70	3x2½	1740	7½
50000	108	2290	.71	211	12.82	15	1150	108	144	93.5	175	60	2½x2	1740	5	223	80	3x2½	1740	7½

From P. 2—Bulletin A23029. Supplement to P. 16—Bulletin A22029.

C.F.M.—Cubic feet of air per minute.

O.V.—Outlet velocity at fan discharge in feet per minute.

(*) R.P.—Resistance pressure in inches of water gauge. (Includes ¼ inch water gauge over requirements for overcoming duct and other resistance.)

R.P.M.—Revolutions per minute.

B.H.P.—Brake horsepower.

G.P.M.—Gallons of water per minute.

Head in Feet—Pressure against which pump operates when handling the required capacity of water.

(†) Wet Bulb Depression—is the difference in degrees (F.) between the dry bulb temperature and the wet bulb temperature of the air. In most localities, it is desirable to select the pump and motor for lowering the dry bulb temperature of the entering air 60% of the wet bulb depression, to provide the most comfortable conditions in the theatre without over-humidification.

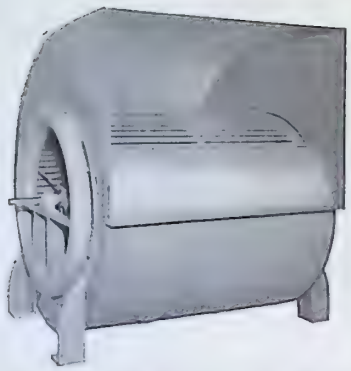
In climates such as encountered at Denver, Colorado, where the humidity is ordinarily low, the pump and motor can be advantageously selected for lowering the temperature of the entering air 70% of the wet bulb depression.

Write for Forms 1129-22-23-24 for Complete Details.

NATIONAL THEATRE SUPPLY
Division of National • Simplex • Bludworth, Inc.

A UNIT OF NATIONAL STANDARD THEATRE EQUIPMENT

National Fans and Air Washers



THEATRE FANS

1. Designed and built especially for theatres by the world's foremost manufacturer of cooling, heating, ventilating, conditioning and allied equipment.

2. Ratings are certified and are in accordance with the standard test code for centrifugal and propeller fans adopted jointly by the N.A.F.M. and A.S.H. & V.E.

3. Operates at a lower speed for a given capacity than any other type of fan.

4. For a given speed it delivers more air per revolution than any other type fan.

5. It is economical in power consumption, quiet in operation, smooth in performance, durable, and occupies a minimum amount of space.

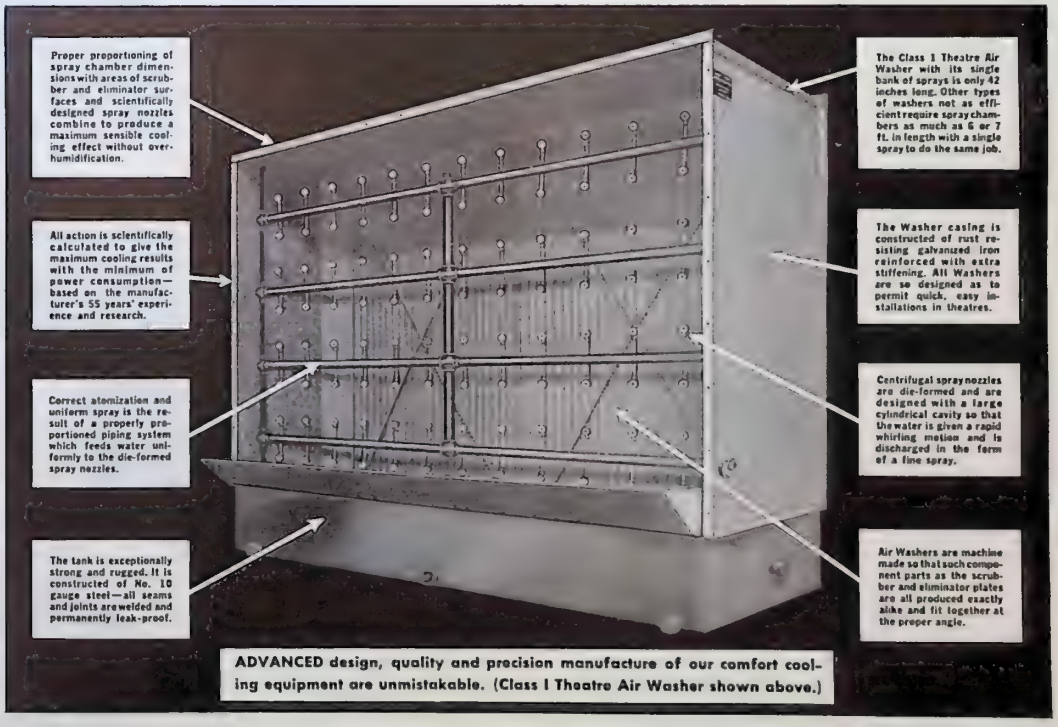
6. THE NATIONAL THEATRE SUPPLY FAN is rugged and strong but light in over-all weight.

THREE WAYS TO COMFORT

1 AIR IN MOTION—For the refreshing, cooling effect of an ample, circulating supply of fresh, outdoor air, NATIONAL THEATRE SUPPLY FANS are the first step in comfort cooling. They are designed and built especially for theatres . . . smooth and quiet in performance, durable, compact, and capable of moving tremendous quantities of air, year in and year out.

2 WASHED AIR—NATIONAL THEATRE SUPPLY CLASS I AIR WASHERS cleanse, purify and freshen the air, remove bacteria-laden dust and water-soluble odors, and have a remarkable cooling effect (by evaporative cooling). Air is brought into intimate contact with water, then sweeps through the theatre like the fresh breeze that follows a rain. Additional cooling effect is provided when cold "well water" is used. (See cooling by "chilled" air, below.)

3 "CHILLED" AIR—NATIONAL THEATRE SUPPLY CLASS II AIR WASHERS (Dehumidifiers) give remarkable Comfort-Cooling effect when "well water" 55° F. or colder is available. Utilizes the cooling effect of the cold "well water," and also washes water-soluble dust and odors from the air. Used with your present or new National Theatre Supply Fan, the Class II Washer provides tremendous quantities of clean, moving, "chilled," nature conditioned air. If you have "cold water" in limited quantities, it can be used in combination with recirculated city water, either with the Class II Washer or Class I Washer.



ADVANCED design, quality and precision manufacture of our comfort cooling equipment are unmistakable. (Class I Theatre Air Washer shown above.)

A UNIT OF NATIONAL STANDARD THEATRE EQUIPMENT

NATIONAL THEATRE SUPPLY
Division of National • Simplex • Bludworth, Inc.

Westinghouse Electric Corporation

Sturtevant Division

HYDE PARK • **BOSTON 36, MASS.**

Westinghouse-Sturtevant Division manufacturers a complete line of air conditioning, heating, ventilating and air handling equipment. Shown here is a selection of the complete line. Individual product catalogs are available where more detailed information is required on any item.

STURTEVANT PUTS AIR TO WORK

Equipment designed to "Put Air to Work" is available for all commercial and industrial buildings, to improve comfort and efficiency and to provide industrial process air conditioning. Applications range from the small ventilation and air conditioning systems to the large specially engineered installations.

ENGINEERING ASSISTANCE

Sturtevant offers unbiased engineering assistance in the selection of the correct product for the specific application. Many years of experience in the design and manufacture of these products combined with the benefits of close co-operation with consulting architects and engineers, assure you of reliable recommendations.

Offices and Distributors are located in all principal cities. Refer to your local classified telephone directory.

REFRIGERANT COMPRESSORS

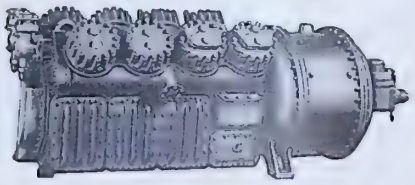
Hermetically Sealed, Freon-12, refrigerant compressors are designed for air conditioning and industrial refrigeration applications requiring suction evaporating temperatures ranging from 10°F. to 50°F.
Westinghouse Special Features include:

1. Shaft seals eliminated.
2. Direct drive—no belts, pulleys and couplings.
3. Sealed-in mechanism.
4. Refrigerant-cooled motor.
5. Compact size and light weight.

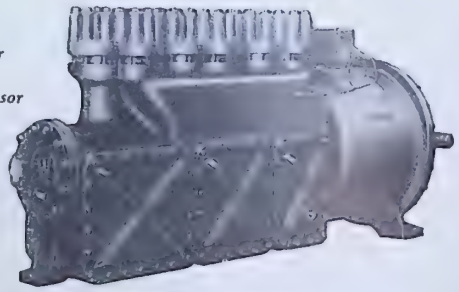
The hermetically-sealed compressors are reciprocating multi-cylinder, in-line type in sizes 7½ to and including 60 horsepower; 90 degree V-type on the 2, 3, 5, 75 and 100 horsepower sizes. They are protected by manually reset high and low pressure switch. Driving motors are polyphase, refrigerant-cooled induction type. Motors are protected by thermal overload protection in the De-ion magnetic line-starters.

Mounting supports are available to permit mounting the compressor and suitable Westinghouse water-cooled condenser as a unit. Compressors are made in twelve sizes, ranging in nominal capacities of from 2 to 100 tons net refrigeration effect.

Sixteen-Cylinder V-Type Compressor



Six-Cylinder In-Line Type Compressor



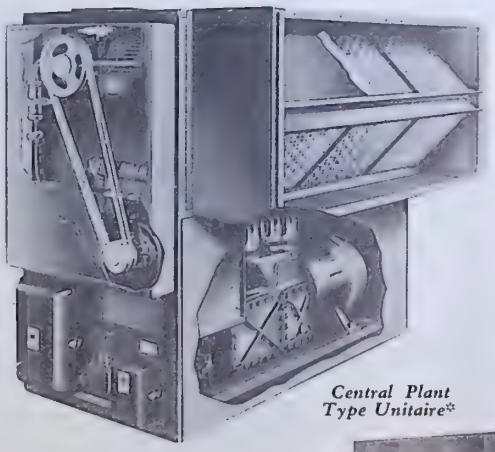
UNITAIRE* AIR CONDITIONING UNITS

CENTRAL PLANT TYPE Unitaires are self-contained, with all the component parts of an air conditioning system, designed especially for installation with supply and return air ducts. Unitaires are assembled, piped, refrigerant-charged, wired and adjusted at the factory. Each is given a complete operating test to assure satisfactory performance when installed. All that is required is connection of water and electrical service and attachment to the duct system.

The condensing unit is a standard Westinghouse hermetically-sealed direct-connected compressor, with water-cooled condenser, isolated from the supporting structure by rubber anti-vibration mountings.

Central Plant Type Unitaires are available with 7½, 10, 15, 20 and 25 horsepower compressors.

IN-THE-SPACE TYPE Unitaires are widely used in small stores, restaurants, office suites and similar establishments. Usually they are installed in the room to be air conditioned, but in many cases they are remotely located with ducts supplying one or more spaces with air conditioned air. Available in 1, 2, 3, and 5 horsepower sizes.



*Central Plant Type Unitaire**

EVAPORATIVE CONDENSERS

Where water is scarce or expensive, or its use or disposal restricted, the "Aquamiser" provides savings in water consumption. Westinghouse Aquamisers are available in sizes to give a range of capacities from approximately 5 tons to 100 tons each, net refrigeration effect.



"Aquamiser" Evaporative Condenser

* Trade Mark Registered U. S. Pat. Office.

Sturtevant Division • Westinghouse Electric Corporation

WATER-COOLED CONDENSERS

Where sufficient water is available from city water supply, or where a cooling tower is used, the water-cooled condenser is economical and efficient. To match economically refrigeration load requirements, Westinghouse water-cooled condensers are available in 14 sizes, ranging in nominal capacities from 2 to 100 tons net refrigeration effect.



Water-Cooled Condenser

WATER-COOLING UNITS

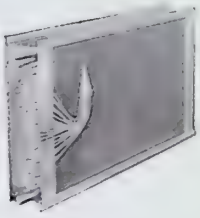
Vertical, semi-flooded type, Freon 12, water coolers for the chilling of water for distribution to cooling coils in indirect air conditioning systems and for surface dehumidifiers. These efficient water-chilling units range in size from 5 to 110 tons net refrigeration effect.



Water-Cooling Unit

HEAT TRANSFER SURFACES

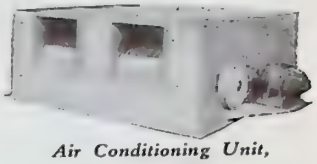
Direct expansion coils with patented refrigerant distributor, chilled water coils, steam and hot water coils are available in a great many sizes for all types of systems.



Heat Transfer Surface

AIR CONDITIONING UNITS

Two types are available—a horizontal type for ceiling suspension and a vertical type for floor installation. In the horizontal and vertical types, year-round air conditioning is accomplished by the installation of cooling and dehumidifying surfaces for summer, and heating surfaces for winter air conditioning.



Air Conditioning Unit, Type AH

AIR WASHERS

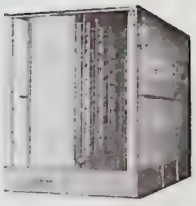
Three types are available—Type H, with one bank of nozzles, used primarily for humidifying; Type C, with two banks of nozzles, used for evaporative cooling, humidifying and dehumidifying; and Type S, with one bank of nozzles, used for humidifying, especially where space is limited.



Air Washer and Spray-Type Dehumidifier

FILTER-WASHERS

Self-cleaning filter-washers employ a bank of mineral wool, or glass fiber filter pads, in conjunction with water sprays to clean and humidify the air. Made in 72 standard sizes and to specifications.



Filter Washer

SURFACE DEHUMIDIFERS

Available for either chilled water or directly expanded refrigerant, these wet surface units control accurately wet and dry bulb conditions in industrial and comfort air conditioning systems. Capacities range from 2000 to 50,000 cfm, with cooling capacities of 5 to 250 tons of refrigeration.



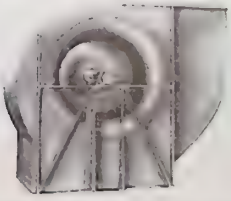
Unit Dehumidifier

PROPELLER FANS

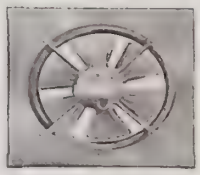
PROPELLER FANS, DESIGN 7, with direct-connected motors, are generally applicable to all air exhausting or ventilating problems when unit blows air directly outdoors or to another room, without ducts or high resistance to air movement. Motors are totally enclosed special fan duty type. Design 7 Propeller Fans are made in 7 sizes, from 12" to 36" diameter, and 815 to 11,050 cfm.

CENTRIFUGAL FANS

SILENTVANE,* DESIGN 8, are high speed, exceptionally quiet heating and ventilating fans engineered for installations where fan noise cannot be tolerated. Made in 21 sizes with rotors from 12¼" to 87¾" in diameter, they operate from free delivery to 4" water gauge static pressure, and at a maximum tip speed of 9000 feet per minute. Capacities range from 700 to 400,000 cfm.



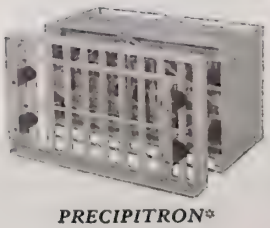
Silentvane Centrifugal Fan, Design 8*



Propeller Fan Design 7

PRECIPITRON* ELECTRONIC AIR CLEANER

This electronic air cleaner is designed for installation in the duct of an air conditioning or ventilating system to remove air-borne dust and dirt particles, with an efficiency of 90% by blackness or discoloration test. Made in sections, it can be applied to systems of 1200 cfm and over. PRECIPITRON high cleaning efficiency reduces the cost of redecorating and cleaning by removing dust and dirt particles from the air which are too small to be removed by conventional mechanical filters.



PRECIPITRON Cell and Ionizer*

UNIT VENTILATORS

Unit ventilators filter, heat and circulate air through room areas. Each unit is equipped with heating coil, a fresh air inlet, motor driven fans, and controls, all enclosed in an attractive steel cabinet. Available in auditorium type units for heating auditoriums and similar large room areas.



Unit Ventilator

* Trade Mark Registered U. S. Pat. Office.

To Get Satisfied Customers . . . BE ONE YOURSELF!

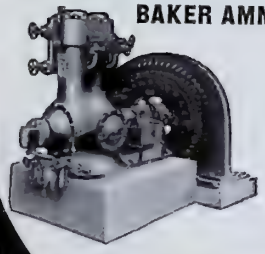
Specify Baker

FAMOUS FOR 42 YEARS AND IN 68 COUNTRIES

NEW MODELS
Scheduled for Production in 1947
Baker Models F-82, F8A, F69
4-Cylinder Ammonia Compressors
30 to 80 tons capacity.
Write for details

PRODUCTS: Ammonia Compressors; Self-contained Ammonia Units; Self-Contained "Freon-12" Units; Shell and Tube Condensers, Vertical or Horizontal; Refrigeration Valves and Fittings; Water or Brine Coolers, Shell and Tube or Multi-Unit Type; Coils and Cooler Units of all sizes; Automatic Refrigeration Controls and Accessories; Evaporative Type Condensers.

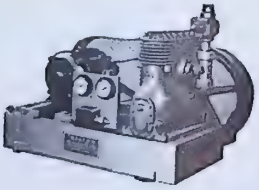
BAKER AMMONIA COMPRESSORS



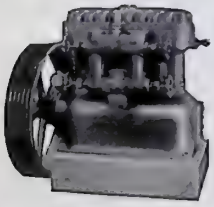
From 1 to 100 tons capacity. V-belt drive, or direct connection to motors or engines. Vertical enclosed single-acting type. Duplex or multiple installations to obtain any desired capacity.

"FREON-12" COMPRESSOR UNITS

Arranged for use with evaporative type condenser or separately mounted shell and tube condensers. Sizes from 3 h.p. to 20 h.p. Two and four cylinder types. Automatic controls.

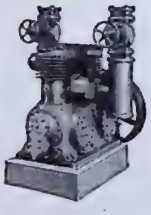


BAKER AMMONIA COMPRESSOR UNITS



Model F6B from 7½ to 20 h.p. Bore and stroke 3½" x 3½". Four cylinders, reciprocating single acting type. Force feed lubrication. Timken Roller Bearings. This model available in single or multiple compressor or condensing units as desired.

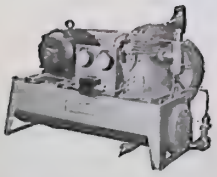
BAKER AMMONIA BOOSTER COMPRESSORS



For sub-zero temperature work. Lubrication under pressure. Single or multiple compressor installations. V-belt or direct drive. Large gas manifold at compressor suction ports allows complete filling of cylinder at variable speeds.

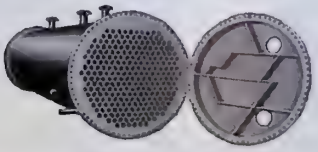
BAKER "FREON-12" UNITS

"Freon-12" Units of the self-contained automatic type from ¼ to 20 h.p. capacity in single units. Furnished in air-cooled type ½ to 20 h.p. and water-cooled type 3 to 20 h.p.



BAKER SHELL AND TUBE CONDENSERS AND COOLERS

ASRE or National Board Code welded single units to 150 tons, multiple units any capacity. Shells 8" to 50" diameter. Removable heads. Vertical or horizontal, single pass or multi - pass. Brine or water.

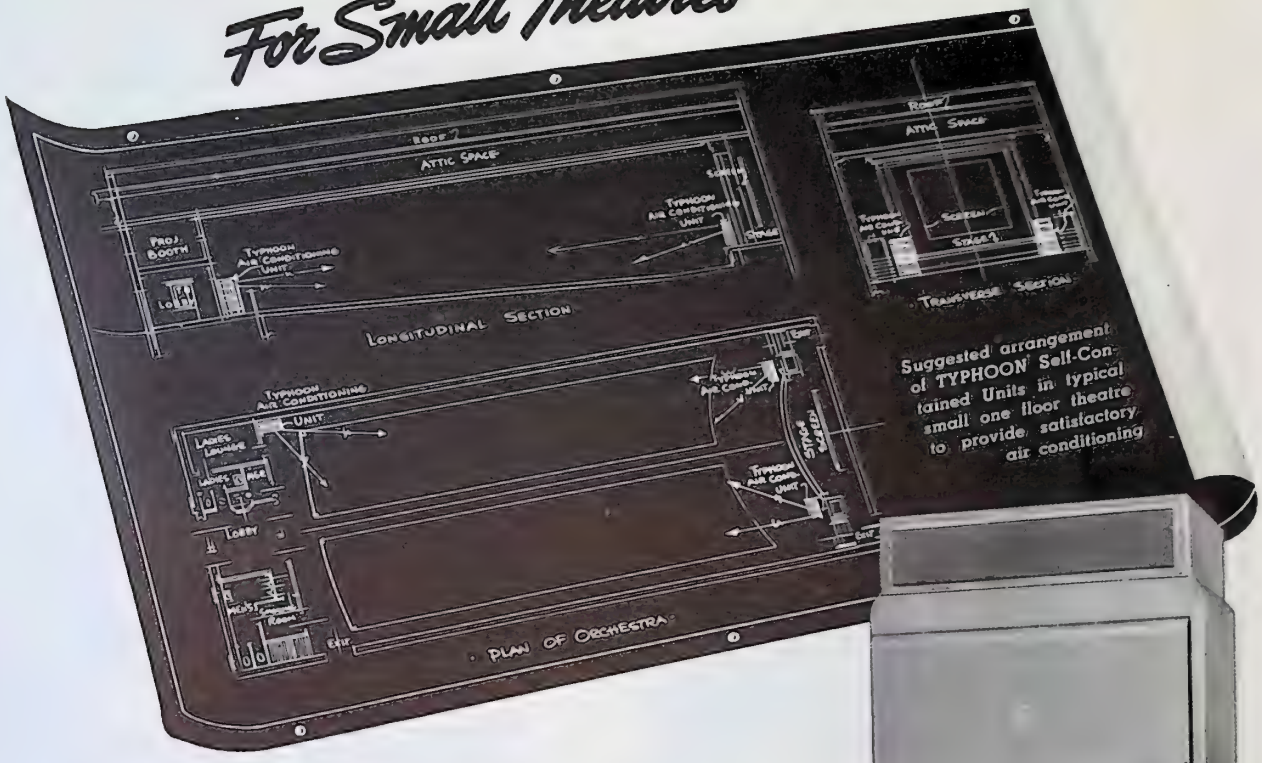


BAKER ICE MACHINE COMPANY, INC., SOUTH WINDHAM, MAINE / OMAHA, NEBRASKA

MANUFACTURERS OF REFRIGERATION AND AIR-CONDITIONING EQUIPMENT SINCE 1905

Low Cost Air Conditioning

For Small Theatres





3-ton, 5-ton, 7-ton sizes

New Box Office Appeal with

TYPHOON UNITS

Compact, streamlined units that offer definite advantages to theatres with seating capacities up to 800 . . . incorporating over 35 years of theatre cooling experience.

- *Zone Control* — Each unit has its own individual thermostat.
- *No Duct Work Required*—No loss of cooling due to long ducts.
- *Easy to Install* — Units can be placed directly in theatre, no extensive alterations.
- *Silent Operation* — No vibration, no interfering noises.
- *Uninterrupted Service* — Your theatre *always* has air conditioning; if one unit is being serviced, other units are not affected.
- *Dehumidification* — High latent heat capacity insures more effective removal of moisture.

* * *

Each self-contained unit cools, filters, de-humidifies and circulates the air in summer . . . heats efficiently in winter. Extra-large coils, condensers and other over-sized parts are designed to give hard service and deliver full rated capacity under trying conditions.

Ruggedly built, these Typhoon units operate with minimum servicing. Flexible, economical to operate, with moving parts completely accessible, they are thoroughly dependable. *For complete information write*

NOTE: Owners, builders and architects of small theatres (200-800 seats) — Write TYPHOON for suggested theatre arrangements of self-contained units.

TYPHOON AIR CONDITIONING CO., Inc.
Division of ICE AIR CONDITIONING CO., INC.
794 Union Street • Brooklyn 15, N. Y.



Comfort Cooling

ENGINEERED FOR

Bigger Box-office AND Greater Profits!

Several thousand theaters from coast to coast find comfort cooling highly profitable with USAIRCO equipment. And because of the unusual flexibility of the USAIRCO Theater line many more houses are added every year.

Whatever your needs for cooling, heating, ventilating or air conditioning, USAIRCO can provide equipment from a single blower to a central system for year 'round air conditioning. Kooler-aire comfort cooling units are available for evaporative, refrigeration or cold water installations.

USAIRCO engineering counsel is ready to cooperate with you, or your architect, in planning the installation you need. Consult with USAIRCO now and have your plans made and equipment ordered.

UNITED STATES AIR CONDITIONING CORPORATION
Como Ave. S. E. at 33rd, Minneapolis, Minn.

USAIRCO

3 COMFORT COOLING SYSTEMS AT BUDGET LEVELS

Refrigerated Kooler-aire
A self-contained complete refrigeration cooling unit. USAIRCO manufactures a complete line of refrigerated, cold water and evaporative air conditioning systems.



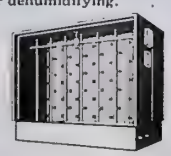
Evaporative Kooler-aire
USAIRCO's evaporative comfort cooling uses washed filtered air for efficient, economical application in shops, theaters, offices. Many sizes and capacities available.



USAIRCO Blowers
Heavy and light duty blowers, single or double inlet, in sizes and capacities for any heating, cooling, ventilating and air conditioning application.



USAIRCO Air Washers
Single, double or triple stage 2,500 to 100,000 cfm for cleansing, cooling by cold water or refrigerant, humidifying or dehumidifying.



MISCELLANEOUS SUPPLIES and EQUIPMENT

1947-48

Cleaner Theatres Build Bigger Box-Office

The Stationary and Portable Vacuum Systems Contribute to Dividend-Paying Cleanliness

C. S. Jennings
Allen-Billmyre Division, Lamson Corporation

Like any other business, theatres sell a product. But unlike many business enterprises, the theatre's product changes several times a week. If this product—the film—is good, it will draw patronage. If not, the box-office "temperature" goes down. Product, therefore, is the primary essential to good business. But there are others.

The essential second in importance is, without a doubt, theatre cleanliness. As living conditions in this country improve, people naturally look for more courtesy and cleanliness in their community theatres. And if theatre managers want to counteract some of the criticisms occasionally directed at movies and their influence, then it becomes even more important that their theatres are clean, bright, and wholesome places to live in for several hours of the day.

This problem is particularly important today, inasmuch as most theatres now have counters for candy, popcorn, and so forth.

In a survey of theatres and managers, recently made by Lamson Corporation on theatre maintenance, many astute managers believed that patronage might very easily drop 60 to 85 per cent if a theatre were unclean. People want a good picture, but they also want a clean theatre to see it in.

For the most part, theatres today maintain cleanliness of carpeting, seats, and drapes by vacuum cleaners. In most large theatres, the stationary central systems are preferred; in smaller ones, portables often serve the purpose adequately.

In many theatres throughout the country, central vacuum systems of various trade names have been in use for years. According to our own experience, for example, many Exidust Central vacuum systems, made by the Allen-Billmyre Division of Lamson Corporation, have been in operation for twenty or more years without a single breakdown. At the Brooklyn Fox Theatre, such a system was installed in 1928 and it is still in nightly operation.

Despite the fact that these and other houses are not by any means new, even casual inspection would discern the fine condition of the theatres. The carpeting is clean and practically free of dust and germs. And, though thousands of people have shuffled their way across the carpeting with wet or dirty shoes, it is still well-preserved. This in itself is an economy, and a big one.

Labor, too, is held at a minimum. In a theatre with a capacity of 2,500 to 3,000 seats, one man can do all necessary vacuum cleaning in one night. As a matter of fact, any other system of cleaning is pretty much out of the question.

Finally, the stationary vacuum cleaning system is proved practical. Breakdown is a very rare occurrence. The system will draw all the small papers, match boxes, candy wrappings, grit, dust. If it goes through the nozzle, it will eventually land in the receptacle in the basement. Piping is always large enough to prevent clogging.

Usually theatre architects plan for a central vacuum system. It is possible, however, to install one after a theatre is built, though the cost would be higher. Those theatres not so equipped, usually resort to portable heavy-duty vacuum cleaners. Many theatre managers find this machine adequate for their needs, even in houses with a capacity of 2,000 seats. Since these portables are comparatively inexpensive, any theatre owner can well afford one to maintain a cleaner theatre.

If statistics are correct, 35,000,000 Americans—children, women and men—attend motion-picture houses every day. This tremendous patronage is, no doubt, due primarily to the genuine interest people have in Hollywood films. But it is also true, that as the product became better, the theatres also improved. They are more comfortable, brighter, and more decorative. Above all, they are clean—and vacuum systems have contributed to this cleanliness more than any other single factor in theatres today.

IN A THEATRE with a capcity of 2,500 to 3,000—such as the Fox Theatre, Brooklyn, pictured here—one man can do all the necessary vacuum cleaning in a single night. The system will draw all small papers, match boxes, candy wrappings, grit, and dust without danger of clogging.



THE DUST-COLLECTING RECEPTACLE, such as this one at the Walton High School, New York, with two vacuum exhausters, is located in the basement. This type of system—with pipes always large enough to prevent trash from clogging—is designed into the building, but it can also be installed later.



Sprinklers for That Extra Fire Protection

"Automatic Firemen" Continuously on Guard For Instant Action Whenever a Fire Starts

A. D. Bosch
Secretary, National Automatic Sprinkler and Fire Control Association

"The reasonable safety of the public requires that automatic sprinklers be persistently urged, followed up, and demanded in the building laws and police laws until every theatre has this protection." So said John R. Freeman, a fire protection engineer of international reputation, many years ago. At that time only a few theatres were equipped with sprinkler systems for the automatic control of fire. But the recurrence of tragic fires involving serious loss of life aroused public authorities in many of the large cities of the country to enact ordinances requiring sprinkler systems in the stage areas and dressing rooms, so that today more theatres are protected to some extent with automatic sprinklers.

SAFETY TAKEN FOR GRANTED

In the large city playhouses, the presence of firemen during performances also supplements "on the spot" surveillance against fire hazards, but there are thousands of small theatres which are not required to have this protection. The average American goes perhaps once a week for entertainment to the neighborhood movie house. He enters the theatre with expectancy and the hope of an enjoyable carefree three hours or so. His mind is far away from the perils of fire, but, if he is sitting in the loge he is suddenly brought face to face with that danger because of the persons smoking around him. He subconsciously hopes that his neighbor will squash the butt thoroughly when finished with the cigarette.

Theatre auditoriums are seldom sprinklered. Some terrible fires have occurred in balconies, yet the loge apparently is considered fire-safe as smoking is not prohibited. It has been estimated that an average of four or five fires break out in theatre buildings every day. Fortunately, the public is not always present, but the men who have to fight these fires have suffered losses in their ranks, such as in the blaze of May 19, 1943, which caused the death of three firemen when the mezzanine in the Victory Theatre, Salt Lake City, collapsed. This theatre was equipped to handle road shows, but at the time of the fire was catering only to motion-picture customers. Needless to say the building was not sprinklered and has never been rebuilt.

Eddie Foy was performing in the play, "Mr. Bluebeard," at the Iroquois Theatre, Chicago, Illinois, on that memorable matinee of December 30, 1903, when flames swept the stage and auditorium, resulting in a toll of 602 dead and 250 injured. Foy, in describing his experience as an eyewitness to that awful tragedy, said:

"The theatre was one of the finest that had yet been built in this country —a palace of marble and plate glass, plush and mahogany, and gilding. It had a magnificient promenade foyer, like an Old World palace hall, with a ceiling 60 feet from the floor and a grand staircase ascending on either side. Backstage it was far and away the most commodious I have ever seen. . . .

"We were told that the theatre was the very last word in efficiency, convenience, and, most important of all, in safety. It is true that the building itself was probably as nearly fire-proof as a building can be made, but because of certain omissions—some careless and made in the interest of economy—it was a fool's paradise. There had been no great theatre disaster in this country for many years, and all precautions against such a thing were greatly relaxed."

This observation, made many years ago, sounds very familiar. Only last year (1946) the news accounts about the fatal fires in the so-called "fire-proof" LaSalle and Winecoff Hotels were emphasizing the fire-resistant construction of these buildings, yet they were the scenes of deadly fires. These events in seemingly fire-proof buildings shocked the public and hastened enactment of laws requiring the installation of automatic sprinkler equipment in hotels.

FATALITIES AROUSE PUBLIC

The fatal catastrophes last year in hotels caused a public awakening of the dangers from fire and country-wide demand for action is still underway. The national fire-waste reached such dizzy heights that even the President of the United States deemed it necessary to do something to stop this irrevocable waste of life and property. The fire loss in theatres has also been mounting. Owners and operators would do well to pause and consider seriously whether their theatres possess modern fire-protection facilities.

"The show must go on" is the trouper's maxim. The same principle should be applied to the physical properties of the theatre to insure continunity in business. A more general use of automatic sprinkler systems for the protection of public places of assembly, as well as in other classes of occupany, was recommended by the President's Conference in May, 1947.

AUTOMATIC SPRINKLERS

A theatre is a place of public assembly and sometimes a mercantile building as well. Earlier this year (1947), fire theatened the Carlson Theatre block in Mayville, New York. In response to an inquiry, Bernard Burns, manager, informed the National Automatic Sprinkler and Fire Control Association that an overheated furnace pipe ignited the beams "and the sprinkler saved the whole block." He said the sprinkler system extends into every corner of the brick theatre building, which covers an entire block. He considers the assurance of safety to patrons the chief gain derived from automatic sprinkler protection, and that is the opinion expressed by other theatre operators.

In August, 1946, the following comment was received by one of the Association's members from the Brant Rock Theatre, Brant Rock, Massachusetts.

THEATRE AUDITORIUMS, such as this of the Rialto Theatre, Lancaster, New Hampshire, are frequently not sprinklered. In this theatre, which is, with this exception, sprinklered throughout, the installation reduced the insurance rate between 50 and 60 percent. On the next page are two pictures showing part of the installation—and the protection a properly installed system can give the theatre.





AN OPEN SPRINKLER HEAD SYSTEM installed on the outside wall of the Rialto Theatre, Lancaster, New Hampshire, prevented damage to the theatre (above) when fire gutted the adjoining building. Such water curtains add further protection against exposure fires. In the lobby (below) of the same theatre may be seen a series of sprinkler heads which stand as automatic firemen in case of a fire.



"We believe you might be interested in knowing what we think of our automatic sprinkler system. Ours is a dry-valve type installed in 1929. Since that time, our sprinkler has more than paid for itself through savings in reduced insurance rates plus the added advantage of having the protection of an automatic fire-fighting system on duty 24 hours a day.

"We had a fire here a couple of nights ago, the first time in all the 17 years since it was installed that we had need for our sprinkler system. If it had not paid for itself before, the job it did on this one night more than justified the investment we made in its installation. The fire occurred at 8:30 in the evening and the theatre was filled to capacity. If the fire had gotten out of control at any time, there was a possibility of a great loss, not only of property but of lives. The fire department in the town of Marshfield is 100 percent call men, so that it took them a little while to get here. In the meantime, our sprinkler system proved it worth, keeping the fire well under control at all times, so that when the fire department arrived, it had a much easier job to handle—and it did a mighty swell job, too. We can best tell you of the terrific heat by telling you that four sprinkler heads went into action and we were very much surprised to see what a thorough job they really did. Incidentally, our patrons feel more secure than ever in our building knowing the extra protection we have afforded them—business is better than ever. We hope we will not need the system again, ever—but, if we do, there is the satisfaction of knowing it will be right on the job."

On May 8, 1947, about 4:15 a.m., a small fire in a stage curtain at the Del Mar Theatre, Santa Cruz, California, was extinguished by the theatre's sprinkler system. Fire department members said that the blaze started from a lamp which was standing too close to the drapery and which workmen used while putting in new rugs. Barney Gurnette, district manager of the Golden State Theatre and Realty Corporation, wrote on June 22.

"Our recent fire could have been a great deal more serious if it had not been for the sprinkler equipment on our stage. The heat from the buriing curtain released six of the automatic sprinklers, thereby preventing a more serious fire."

Here is what the proprietor of a chain of southern theatres wrote to another one of the NASFCA members some years ago.

"In our theatres, we protect against loss of operating profits by a fire stoppage through positive action of sprinklers in putting out a fire at the start. We can, and do, cover any loss of physical property by fire insurance; the daily operating profits, however, would in a very few days amount to very large sums, which would be lost if sprinklers did not stop the fire."

Automatic sprinklers are constantly extinguishing fires in theatres not only in this country, where the record, as compiled by the National Fire Protection Association, shows a 95.5 percent satisfactory performance in sprinklered theatres since 1930, but also in other parts of the world. Here is an account

of the fire that occurred on March 30, 1947, at about 11.20 p.m. in the gallery of the Theatre Royal, Edinburgh. Before the firemen arrived, flames had taken a good hold and the front of the house became a total loss. However, the safety curtain and sprinklers saved the stage and the property behind it.

"The members of the theatrical company, which had finished its performance before the fire broke out, saved all its costumes and stage properties. This is the fifth occasion on which fire has damaged the theatre to such an extent as to necessitate rebuilding.

"From the foregoing it will be seen that the protective effect of automatic sprinklers could not be better displayed by a rehearsed demonstration. It is easy to imagine the hold the fire at the front of the house must have had to destroy that part so completely; and yet, where the sprinklers were installed, they came into operation and halted the fire abruptly. Thus we find in one area all the fierceness of a major conflagration and in another, not more than a few feet distant, an absence of fire damage. Members of the staff and company who had removed costumes and scenery to a nearby church hall were able to return the following morning, for the sprinklers had saved the stage, the office, and the dressing-room accommodation behind it. Not only did the sprinklers save the back-stage portion of the theatre itself, but inhabitants of the tenements built on the rear portion of the building were spared the inconvenience, as well as the danger, of what might have been a devastating fire in a congested part of the city.

"There were two 'safety curtains' in the Edinburgh Theatre Royal: a statutory curtain, such as we have all seen, was one; the other, automatic sprinklers, not displayed by us by legal obligation, but always there, and always ready, and independent of human frailty. The Royal was the only theatre in Edinburgh equipped with sprinklers and reports from the management are enthusiastic about their efficient working on this occasion. Horace Collins, managing director of the theatre, paying tribute to the efficiency of the system says, 'Sprinklers worked excellently and saved considerable loss to valuable property. I do not think they are used as much as they should be in theatre construction'."

CONCLUSION

We do not want another Iroquois Theatre fire to happen again in this country. This means to avert such disastrous fires and to insure continuity of operation is available through installation of a properly supervivsed and maintained automatic sprinkler system. The cost of such an installation can be obtained from any member of the National Automatic Sprinkler and Fire Control Association. Your theatre can possess this added fire protection with a minimum of capital investment. The reduction in your insurance cost will pay for the equipment in five to ten years.

The efficiency of automatic sprinklers over a period of 70 years has proved its value in all types of buildings and occupancies. They are the unseen "automatic firemen" that are continuously on guard for instant action when a fire occurs.



THE WORCESTER MEMORIAL AUDITORIUM, Worcester, Massachusetts, is more than three-quarters protected with automatic sprinklers. The sprinkler system covers over and under the gridiron, the entire basement, back stage, the organ loft, all of the hallways, under the balcony, and as may be seen from the upper picture, in the proscenium arch. (All photos through courtesy of NAS&FCA.)



The Tube Transportation of Theatre Cash

Installed between Cashier and Treasurer System Transmits Money in a Few Seconds

P. P. SUITER
Lamson Corporation

Carrying cash to and from the cashier's booth of a theatre has always been a nuisance, and, in some cases, a problem. As any theatre manager knows, this method is often slow and risky, and a chore that goes on all day long. Back and forth, back and forth.

Quite recently, the manager of the Roxy Theatre in New York decided to facilitate the transference of cash and change by installing a Lamson pneumatic tube system. After several years' operation, the system has proved itself. It saves leg work, greatly reduces the danger of theft, and provides a quick, easy communication between the three booths and the treasurer's office. But the treasurer's own words will best describe the results achieved.

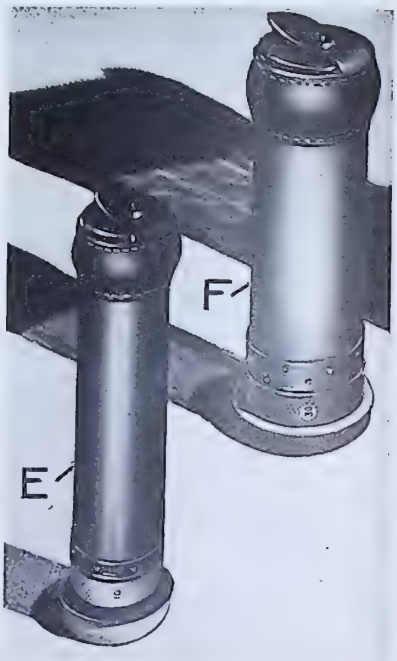
"We are pleased," writes A. D. Shurtleff, assistant treasurer of Roxy Theatre, "to recommend your pneumatic tube system to any theatre desiring to eliminate the carrying of cash from box office to treasurer's office. The installation at the Roxy Theatre has eliminated a great deal of delay and also provided added safety in the handling of cash from cashiers (three) to treasurer's office. Your system was installed during operations of the theatre and at no time were we obliged to close for the purpose of installing any of the necessary equipment. Its operating efficiency far exceeds our expectations."

Though this letter flatters Lamson, we quote it here manly to give first-hand observation of a system which greatly aids theatre management in attaining smoother operation. Such a system, simple in layout and moderate in price, practically pays for itself in a very short time.

At the Roxy, Lamson installed three 4-inch lines to connect the three booths with treasurer's office. Average line is approximately 150 feet and each is independent; that is, there is a station in the treasurer's office for each line.

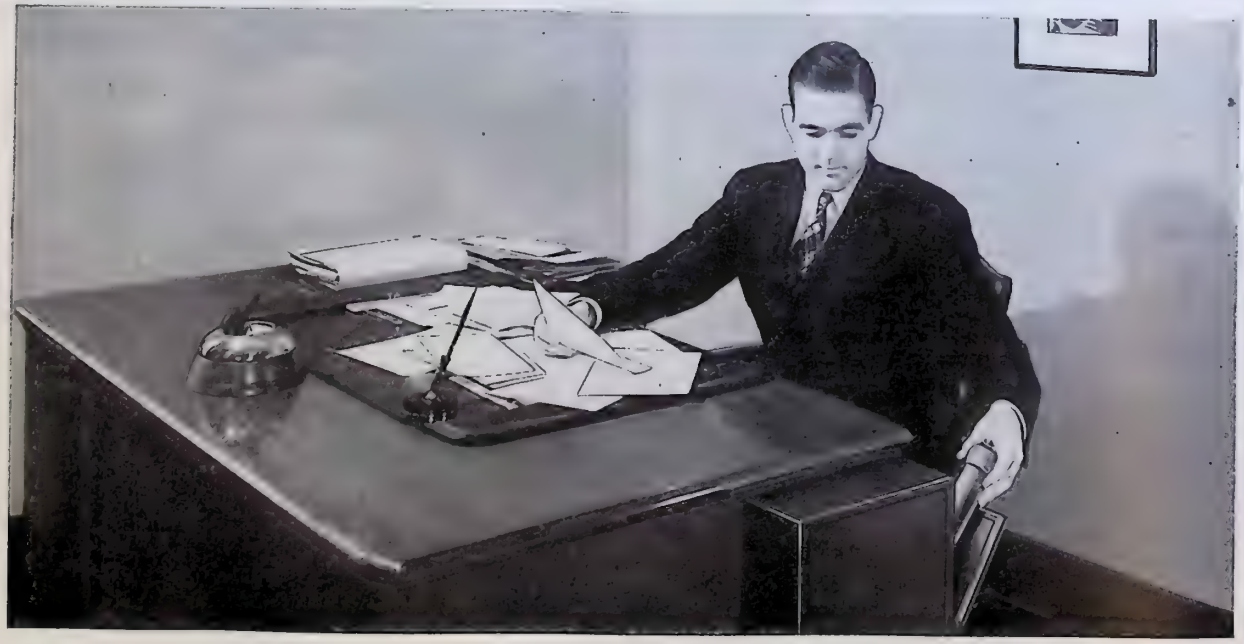
Each of the three lines will transmit a loaded carrier and an empty one at the same time which is adequate handling for theatre use. The carriers may be loaded with 6 pounds of cash or coin.

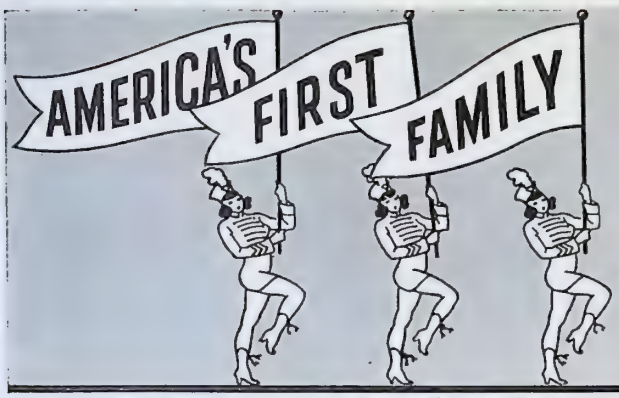
Just before the war, many theatres became interested in the tube system. Lamson alone had already installed four systems: the Metropolitan and Paramount Theatres, in Boston; the Southtown Theatre, in Chicago; and the Roxy, in New York. When the war broke, further installations were impossible in view of material restrictions. Now, however, theatres are again inquiring.



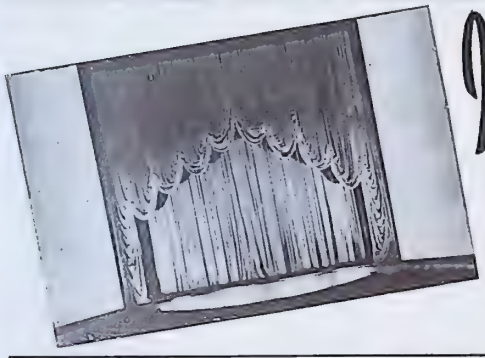
TYPES OF CARRIERS generally suitable for theatre use are these 3- and 4-inch Lamson tubes. The outlets are located in the box office and the manager's office for messages as well as cash.

IN HIS OFFICE, the theatre manager receives a carrier from the box office. If it contains excess cash, he will hold the money. If it is a request for smaller bills or change, he will make the exchange, and return the loaded carrier by tube to the cashier. Carrying cash to and from the cashier's booth is always a nuisance and sometimes even a hazard. The tube system is but one solution for the problem.





of CURTAIN TRACKS and CURTAIN CONTROL EQUIPMENT



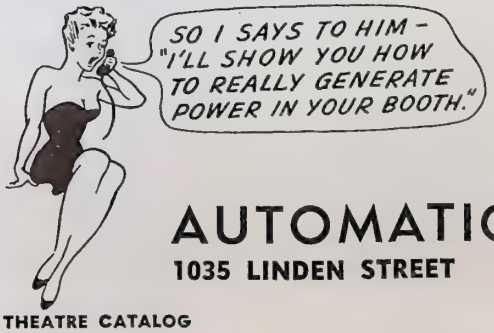
Introduces CONTOUR CURTAINS

(Write for further details)



ADC GUIDE FOR POTENTIAL BUYERS

TRADE NAME	DESCRIPTION	RECOMMENDATIONS	DELIVERY
BESTEEL	Medium duty steel fireproof curtain track for light and medium weight curtains. Carriers roll on 2 separate parallel treads.	For lengths up to 36 feet.	Immediate
Fenesteel	Window curtain track—steel and fireproof. Features self-lapping master carrier which eliminates overlap. Installed single in one section. Carriers roll on 2 separate parallel treads.	For lengths up to 36 feet.	Immediate
SILENT STEEL	Heavy duty steel fireproof curtain track. Ball bearing carriers roll on 2 separate parallel treads.	For all lengths.	Immediate
autodrape	SPECIAL MODEL has 1/4 HP motor with 60 cycles, 110 volts, single phase (available in other voltages, cycles or currents).	With all ADC tracks for lengths up to 36 feet.	Immediate
	STANDARD MODEL has 1/3 HP motor with 60 cycles, 110 volts, single phase (available in other voltages, cycles, or currents).	With silent steel tracks for lengths up to 50 feet.	Immediate
SILVER SERVICE	Has 1/2 HP motor, 60 cycles, 220 volts, single phase (available in other voltages, cycles. or currents).	With silent steel tracks for lengths up to 80 feet.	Immediate
STAND STEEL	22-inch high control stand designed for easier operation of curtain machine. Eliminates dirt and safety hazard normally prevalent when based on floor.	For both Autodrape machines.	Immediate

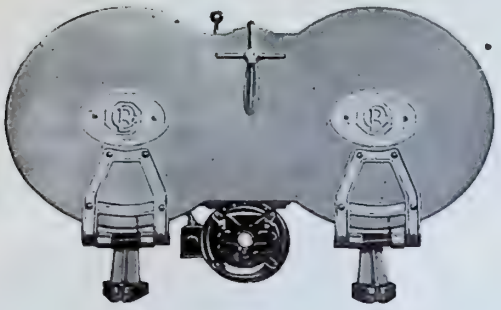


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AUTOMATIC DEVICES COMPANY

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GOLDBERG BROTHERS
METAL PRODUCTS



NEW AUTOMATIC FILM REWINDER

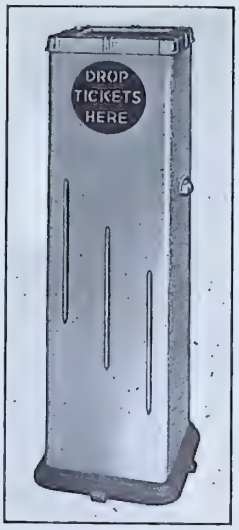
Passed by the board of Fire Underwriters, accommodates 15-inch reels and smaller . . . reels slip on spindles quickly and easily. The rewinder is equipped with an automatic stop.
New Goldberg Rewinder is made of heavy metal, carefully machined . . . doors open on extra heavy counter-balanced spring hinges . . . a large handle keeps the door perfectly tight. A control handle for starting.

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Attractive looking, made of heavy high grade steel, baked enamel crackle finish and aluminum polished top. Made in two styles: G.T.B.. has glass baffles and cast iron base. P.T.B. has no glass baffles nor cast iron base. Top has slot for depositing tickets. Not in production. Available as soon as the steel shortage eases up.

Made in following colors:

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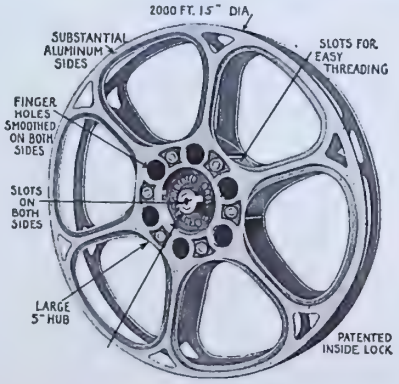




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Good Looking . . . Economical

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15" dia. 5" hub **14" dia. 4" hub**

Approximate weight 2½ pounds each.

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SPEAKING TUBES • METAL SHIPPING CASES • METAL FILM EXCHANGE REELS
16 MM REELS and CANS

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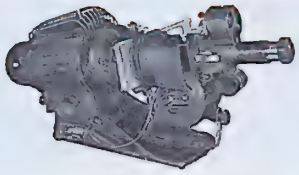
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Other GoldE Products

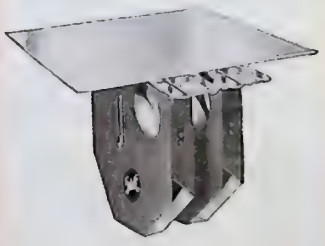
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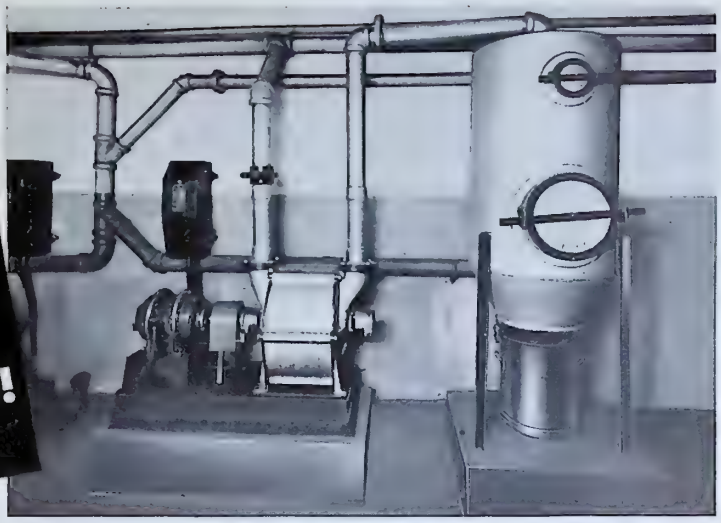
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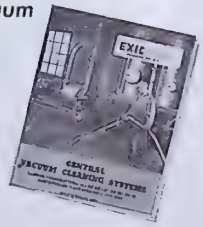
EXIDUST CENTRAL VACUUM CLEANING SYSTEM

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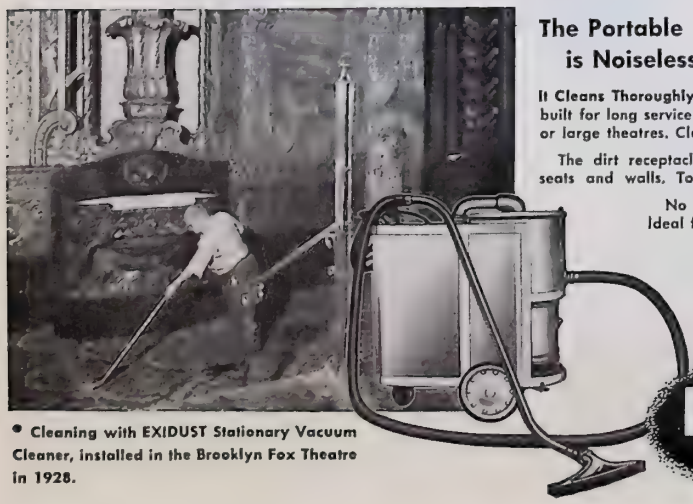
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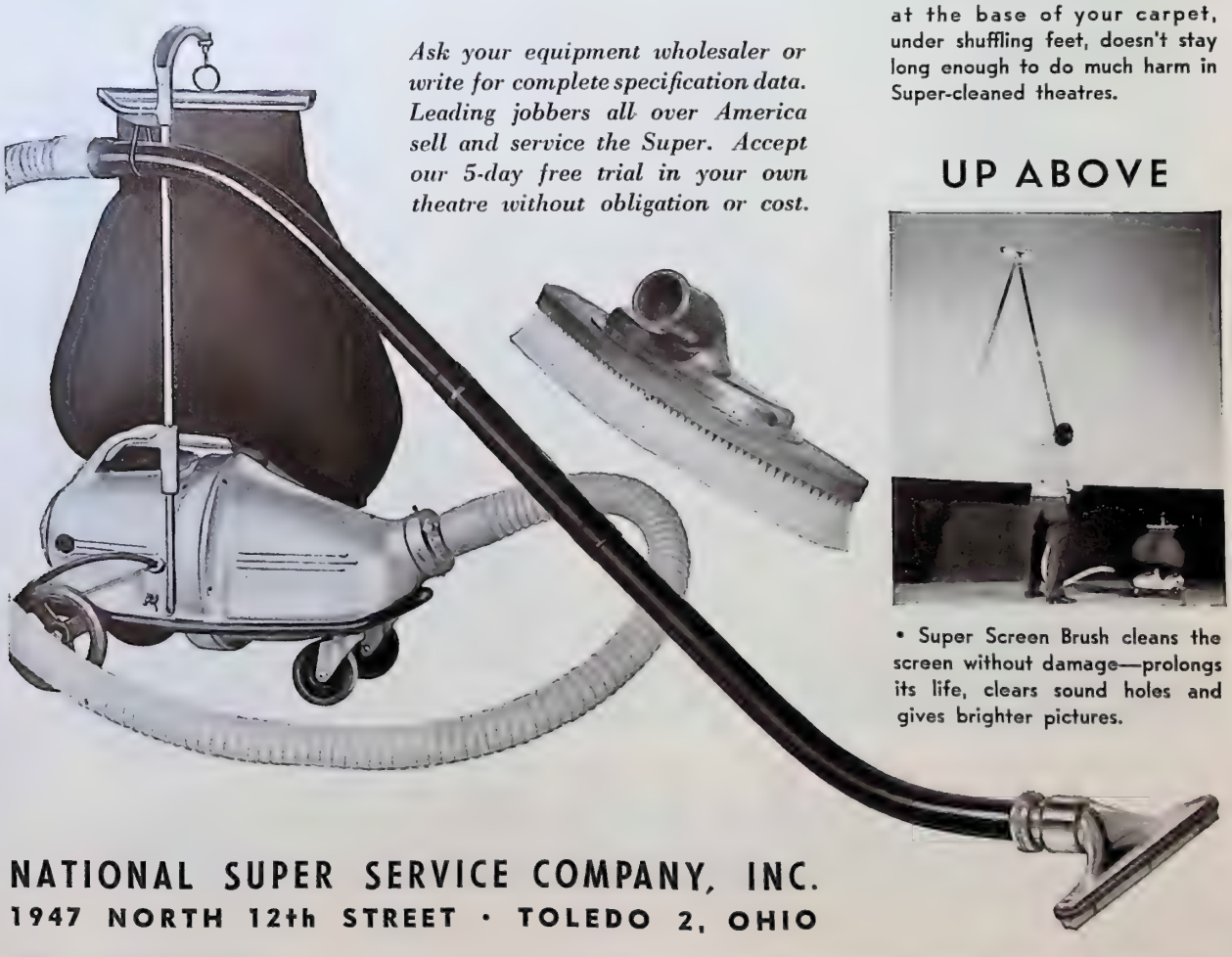
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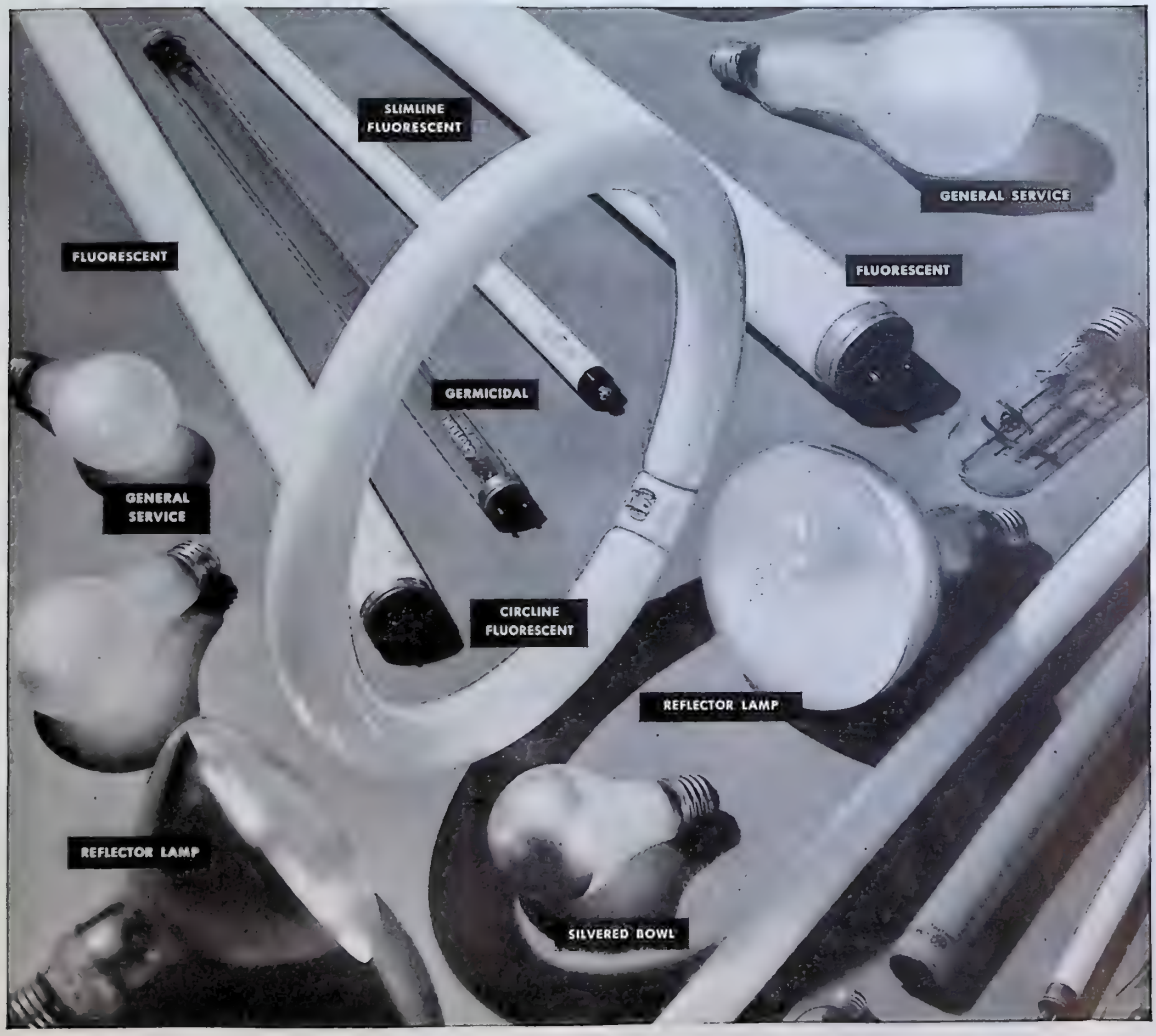
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And remember the constant aim of G-E Lamp research, which is to make G-E Lamps

Stay Brighter Longer!



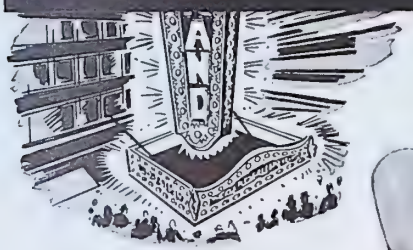
G-E LAMPS

GENERAL ELECTRIC

EVERY THEATRE NEEDS

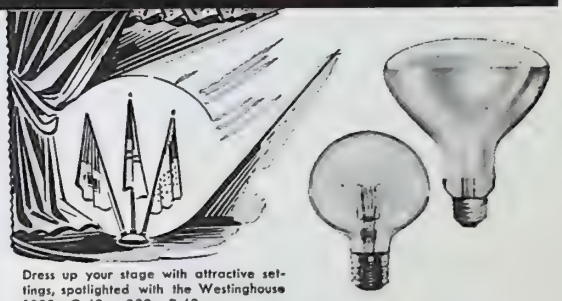
Westinghouse

LAMPS FOR SEE-ABILITY



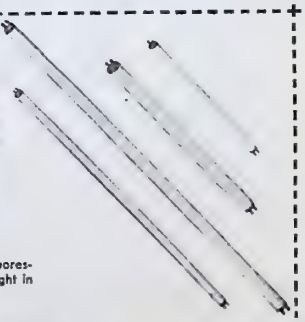


Make your marquee and sign a real attention-getter. Use the standard 10w S 14 inside-frosted for the marquee and the 40w A 21 in clear, red, blue and green for your sign.

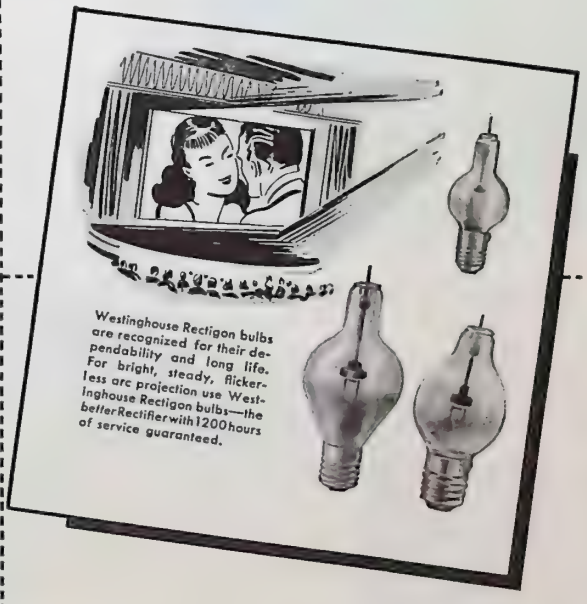


Dress up your stage with attractive settings, spotlighted with the Westinghouse 1000w G 40 or 300w R 40.



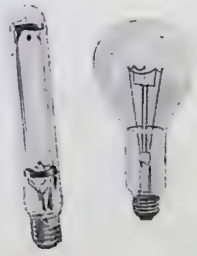


There are plenty of Westinghouse fluorescent lamps available for soft, cool light in the lobby, lounge or rest rooms.



Westinghouse Rectigon bulbs are recognized for their dependability and long life. For bright, steady, flickerless arc projection use Westinghouse Rectigon bulbs—the better Rectifier with 1200 hours of service guaranteed.





Have your customers park their cars in comfort. Flood light the parking area with tubular Mercury Vapor or 1000w PS 52 Incandescent lamps.

Westinghouse

LAMPS FOR SEE-ABILITY

For further information about these and all other types of Westinghouse bulbs consult your nearest Westinghouse Distributor.

OASIS

ELECTRIC WATER COOLERS

"Any Time is Thirst Time"





— and it's good business to make sure your patrons have a ready supply of fresh, cool, clean, drinking water *all the time.* There are OASIS Electric Water Coolers in a range of models and sizes that meet every requirement for dependable, low-cost thirst satisfaction. The new OASIS Water Coolers are preferred for the smooth, easy, "dial-a-drink" action of their famous EBCO 12000 Bubblers . . . for their sleek, modern beauty . . . quiet running efficiency . . . and many other advantages pioneered by EBCO in 20 years of electric water cooler leadership. The OASIS models shown or briefly described here are best suited for theatre needs. Further information may be had promptly from your dealer, or by writing us.

MODEL OP-10 (Left)

Features a handsomely designed, one-piece, space-saving cabinet of heavy-gauge steel. Neat front-corner louvers provide added beauty and maximum cross-ventilation of the condensing unit. Durably finished in rich, deep OASIS brown opalescent lacquer. Recessed base. Durable, easy-to-clean stainless steel top. Easy operating dial-action bubbler with self-closing valve, and piped outlet with removable cap cover for installation of a glass filler if desired. Insulated, efficient cooling unit with EBCO'S patented burst-proof device. Non-clog, counter-flow pre-cooler. Hermetically sealed condensing unit. Size 15¼" wide, 15½" deep, 43⅝" high. Warranteed for 5 years.

MODEL OP-5

This 5-gallon OASIS, indentical to the OP-10 in cabinet styling and bubbler action, is designed for use where demands do not require the higher capacity. Model OP-5 serves approximately 60 persons per hour. Warranteed for 5 years.

MODEL OP-10-V

An OASIS Pressure-Type Electric Water Cooler same as OP-10 except with open type condensing unit for operation on d.c. and odd-voltage or odd-cycle electric current.

WALL FOUNTAIN (Below)

The most practical and economical way to extend the advantages of your electric water cooler service is by means of EBCO Wall Fountains remotely connected to your modern Electric Water Cooler. These low-cost drinking stations may be installed at a maximum distance of 20 feet from the main cooler—on other floors or rooms if desired. The number of these fountains that may be used depends on the capacity of the cooler. EBCO Wall Fountain model V-255, smartly designed in heavy white vitreous china, may be used in almost any location. The unit is 11" long by 7" deep, and projects 11½" out from the wall. Equipped with the regular EBCO dial-action bubbler.



EBCO DIAL-ACTION BUBBLER



EBCO'S easy-operating dial bubbler delivers properly cooled water at the right angle and height for drinking convenience. Self-closing screenless valve is non-clogging, will not squirt or surge. Long-life operating mechanism. Bright chrome-plated bubbler guard. Bubbler meets all public health codes.

MODEL OP-20B (Right)

Has two EBCO trouble-free dial action bubblers, shown above, for heavy-duty service. Serves as many as 200 people per hour. One-piece, welded steel cabinet. Size 22⅝" wide, 20⅞" deep, 44½" high. Smooth opalescent lacquer finish in OASIS brown. Acid-resisting, white porcelain enamel top. Thirteen-quart storage cooling unit. Sealed, stay-clean precooler. Heavy-duty condensing unit, charged with odorless Freon-12 refrigerant.

MODEL OP-20G is similar to above in all details except that it has two GLASS FILLERS instead of the bubblers.



OASIS COOLER DIVISION

The EBCO Manufacturing Co.

401 West Town Street, Columbus 8, Ohio

World's Largest Manufacturer of Electric Drinking Water Coolers



WHEREVER APPEARANCE AND NEATNESS *Count!*

LINTEX COLLARS AND FRONTS are always in evidence. Progressive Chains and Independents throughout the country have found that Lintex Collars and Fronts are convenient and economical.

These collars and fronts are made from specially processed paper with a linen finish. When soiled they are thrown away. No laundry problems with Lintex.

Made in wing or turn-down styles, fronts in plain or P.K.





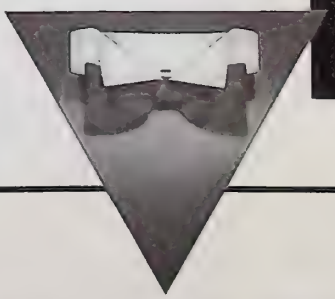


Photo Courtesy
RADIO CITY MUSIC HALL
NEW YORK CITY, N.Y.

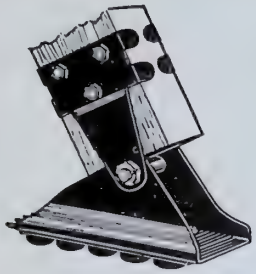
REVERSIBLE COLLAR CO.

111 PUTNAM AVENUE — CAMBRIDGE, MASS.

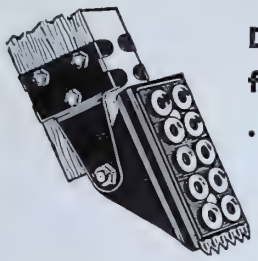
For Safety's Sake Use . . .

DAYTON SAFETY LADDERS AND SHOES

Rubber Tread In Position For Indoor Use.



Spiked Toe In Position For Outdoor Use.



"Listed by Underwriters' Laboratories, Inc."

DAYTON SAFETY LADDER SHOES fit any Standard ladder rails . . . easy to install

Install Dayton Safety Ladder Shoes on your present straight ladders—guarantee additional safety, prevent slipping.

Shoe instantly converted for either indoor or outdoor use.

Shoe or base is made of No. 16 gauge and the side plates are of No. 13 gauge steel. Suction grip treads are renewable. Lock nuts and spring washers insure proper adjustment.

Sizes 3 feet to 16 feet in height with standard rubber safety shoes at no extra cost.



DAYTON SAFETY LADDERS

Maintenance men everywhere rely on Dayton Safety Ladders for maximum safety and convenience. Daytons are constructed of tested airplane spruce and reinforced with rigid steel supports to give great strength and lightness of weight.

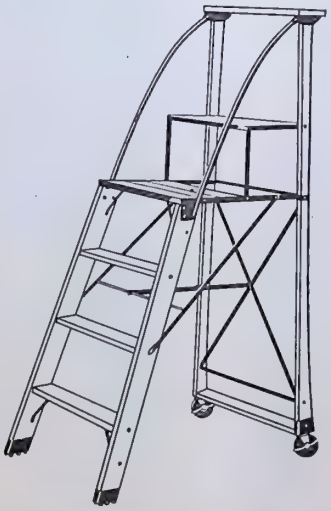
Handrails of steel guard the large roomy platform for added safety. Half of platform can be raised to form an extra step, when needed. These famous ladders can be set up instantly, are easy to carry and fold compactly for storing. Automatic locking feature insures safety while ladder is in use.

DAYTON "ROLL-ALONG" SAFETY LADDERS

. . . The Dayton Roll-Along Safety Ladder with its rubber tired swivel casters can be speedily moved in any direction with practically no effort. Safety shoes with renewable treads hold ladder permanently and safely in place while ladder is occupied.

Constructed of tested airplane spruce throughout and reinforced with steel braces for additional safety. Folds compactly for convenient storing. Available in sizes 3-ft., 4½-ft. and 6-ft.

Elevating auxiliary platform which folds back in main platform adds height if desired. These ladders are being used in many of America's largest plants. See for yourself! Write today for bulletin.



FOR SAFETY'S SAKE . . .
consult our SAFETY DEPARTMENT . . . we have the complete line of safety equipment for your every requirement.

WRITE TODAY FOR COMPLETE INFORMATION

DAYTON SAFETY LADDER COMPANY

2337 GILBERT AVENUE • CINCINNATI 6, OHIO

SUPPLY DEALERS

1947-48

Manufacturers, and the Equipment Dealers

Progress of the Theatre Industry is Traced To Harmony Between the Makers and Sellers

ROY BOOMER
Secretary, Theatre Equipment and Supply Manufacturers Association, Inc.

The Theatre Equipment and Supply Manufacturers Association, Inc., more commonly referred to as TESMA in the theatrical industry, was formulated some fourteen years ago, and one of the primary objectives was to cement a closer relationship between the theatre supply dealer and theatre equipment manufacturer and to improve the conditions in their particular branches of the industry and to meet the problems as they arise in the field. This, I believe, has been done. A closer cooperation now exists between theatre euqipment manufacturer and theatre supply dealer than ever before.

It is my firm belief that theatrical equipment is the heart of the industry. Over two hundred years ago, the first legitimate theatre in England had as its equipment stage scenery and rigging. And so on down through the years, theatrical equipment has played a major part in the presentation of theatrical entertainment. If we did not have raw film, cameras, and studio equipment, we would have no motion pictures. Without projectors, lamps, screens, chairs, and sound equipment, we would have no motion-picture theatres.

Because these theatres require service and immediate replacement of equipment, the theatre supply dealer came into being. His success is ofttimes based on his knowledge of equipment, the service he renders, the stock he carries, and his desire to abide by the theatrical slogan that "the show must go on."

The theatre supply dealer is considered the theatre doctor in his territory. He is the man in an emergency. It is the theatre equipment manufacturers' duty to provide products that will be a credit to the theatre supply dealer: products of quality and durability which will meet the various needs of the theatre owners.

The average theatrical equipment is not turned out on a production-line basis. The demand is not large enough for such operation, and many theatre equipment items are custom-made. Therefore, the theatre equipment manufacturer endeavors to see how well he can turn out a product, not how fast he can do it. The point is best illustrated by the fact that the average motion-picture projector is in operation more hours a day than the average automobile, yet it outlasts the auto by at least from 5 to 20 years.

The theatre equipment supply dealer is the manufacturers' representative in the field. He is constantly meeting the problems of his territory, knows the needs of the consumer, the improvements they desire, and the like. He passes this information on to the manufacturer, who designs, develops, and engineers new and improved items to meet the demands of the changing times and new types of entertainment.

It is, of course, impossible for any one supply dealer to handle all the products manufactured by TESMA members. He generally selects the products he believes best suited to his particular territory.

At the annual trade show, presented by TESMA, the manufacturers exhibit their products to the theatrical industry. Here, ideas are exchanged and many problems are solved.

The harmonious team of equipment manufacturer and theatre supply dealer has been largely responsible for the progress of the theatrical industry, that is now the fifth-largest in these United States. TESMA means quality merchandise and quality merchandise builds bigger and better theatres.

Equipment Dealer's Role in Show Business

Well-Stocked Supplies and Service Know-How Make Dealers Indispensable to the Industry

RAY G. COLVIN
President, Theatre Equipment Dealers Protective Association

When the theatre owner wants advice on any matter pertaining to law, he calls in his lawyer. When he is sick, he immediately summons his doctor. He does this, knowing that he is not himself qualified to cope with the situation that confronts him. When the lawyer gets the call, he at once turns to his law books to review a similar case. Likewise, the doctor, when called, examines the patient and prescribes the remedy.

Now, when this same theatre owner wants some article of equipment for the theatre, he gets in touch with his theatre equipment dealer, who, he knows, will advise him as to the proper type of equipment to be purchased. The doctor and the lawyer have had years of study and experience before they were able to represent a client or to prescribe for a patient, and the same thing is true of the theatre equipment dealer. He, also, has had years of experience going from town to town in his particular territory looking over all types of theatre equipment, listening to the comments of exhibitors and projectionists, hearing of the trouble or success they have had with different items, and, after a few years of this, he has a good practical knowledge of equipment and is in a position to serve his customer in a manner which warrants confidence.

His store is, at all times, well stocked with emergency equipment and, if a breakdown occurs in any given point in his territory, he is obligated and equipped to do the best job of trouble-shooting.

The dealer relies solely on the manufacturer of equipment for his product and uses great care in the selection of the items that he sells, because experience has taught him that, to sell an inferior product, costs him money in the long run. When the theatre equipment dealer equips a theatre for a customer, it is not the initial order that interests him so much as the continued buying of the customer from day to day and from year to year. He knows well, indeed, that if the equipment is inferior, he most certainly will not continue to receive the patronage of the customer.

There are some 19,000 theatres in the United States, and I believe I am safe in saying that the majority of these theatres depend upon the honesty, integrity, and experience of the theatre equipment dealers throughout the country to keep them advised on all the latest developments in theatre equipment, to consult them in matters of construction, and to depend on them to keep these theatres running from the standpoint of equipment and service.

All of which causes me to say with no uncertainty that the theatre equipment dealer is one of the indipensable units of the industry and has a definite place along with the theatre owners, projectionists, and the many others upon whose shoulders falls the work of doing their part to entertain the millions who patronize our theatres.

Show business is a great business. Its slogan always has been—and, I trust, always will be—"Bigger and Better." The closer the relationship between the various units or organizations of show business, the easier it will be to keep alive that slogan, "Bigger and Better"!

Theatre Supply Dealers of the United States

Comprehensive Listing of Names, Addresses, Personnel, Products, and the Areas Served

ALABAMA

THE QUEEN FEATURE SERVICE, INC.
1912½ Morris Ave., Birmingham 3
Telephone: 3-8665

PERSONNEL — *Manager:* Miss Vivian Harwell. *Salesman:* Lewis A. Waits

AREA SERVED — Alabama, Tennessee, Mississippi, Georgia, Northern Florida

CENTURY PROJECTION and SOUND EQUIPMENT

IDEAL CHAIRS—LEEDOM CARPET
SILVER, FLAT WHITE & BEADED SCREENS
VOICE OF THE THEATRE SPEAKER
STRONG REFLECTOR ARCS & RECTIFIERS
ROBIN-IMPERIAL GENERATOS
DRAPES—BLOWERS

Complete Theatre Equipment AND Accessories

ARIZONA

ARIZONA FILM SUPPLY CO.
33 W. Congress St., P. O. Box 5447, Tucson

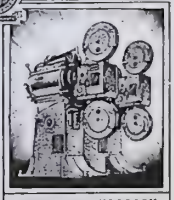
CALIFORNIA

MIDSTATE THEATRE SUPPLY
1906 Thomas, Fresno 3
Telephone: 3-2455

PERSONNEL — *Owner:* Paul Wallace. *Field Service:* W. W. Williams. *General Manager:* Harry Victor

AUTHORIZED DEVRY DEALER

Distributors for
DeVRY Motion Picture Projectors and Sound Systems
DeVRY In-Car Speakers for Drive-Ins and "Brilliante" Lenses
Theatre Seating, Drapes and Curtains
Concession Supply SERVICE
16mm. and Visual-aid Equipment SERVICE
EVERYTHING FOR THE THEATRE



NEW DeVRY "12000" THEATER PROJECTOR

Your Best Buy—DeVRY

BRECK PHOTOPLAY SUPPLY CO.
1969 S. Vermont Ave., Los Angeles 7
Telephone: REpublic 3151

PERSONNEL — *Manager:* J. E. Maguire. *Counter:* Stanley Gray. *Shop:* Louis Krenz.

AREA SERVED — Southern California and Arizona.

***JOHN P. FILBERT COMPANY**
2007 S. Vermont Ave., Los Angeles 7

MOTION PICTURE ACCESSORIES CO.
2200 S. Vermont Ave., Los Angeles 7
Telephone: PArkway 2894

PERSONNEL — *Owners:* James B. Dabney and James B. Dabney, Jr.

AREA SERVED—Western and Coast states

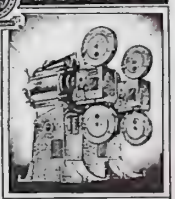
PROJECTION EQUIP. & MAINT. CO.
1975 S. Vermont Ave., Los Angeles 7
Telephones: REpublic 0711, ROchester 0711

PERSONNEL—*Owner and General Manager:* Louis M. Wutke (Emergency Phone WAlnut 0584). *Store Manager:* Earl F. Graff (Emergency Phone Federal 4491)

AREA SERVED—So. Calif. and Arizona

AUTHORIZED DEVRY DEALER

Distributors for
DeVRY Motion Picture Projectors and Sound Systems
DeVRY In-Car Speakers and "Brilliante" Lenses
We carry in stock a complete line of parts for all standard makes of Theatre Projectors and Sound Systems



NEW DeVRY "12000" THEATER PROJECTOR

Your Best Buy—DeVRY

NATIONAL THEATRE SUPPLY
1961 S. Vermont Ave., Los Angeles 7

PERSONNEL—*Manager:* Lloyd C. Ownbey. *Asst. Manager:* M. Bundy Smith. *Office Manager:* E. Braun. *Salesmen:* Glenn Slipper, Jack Hessick, Weldon Girard

AREA SERVED — Southern California, Arizona, Southern Nevada

*Listing not confirmed by Supply Dealer

B. F. SHEARER COMPANY
1964 S. Vermont Ave., Los Angeles 7
Telephones: Rochester 1145 — (Night) Brighton 04901—Pleasant 15261

PERSONNEL—*Manager:* Barclay W. Ardell. *Salesmen:* C. L. Bussell, Ed Budd, Lloyd M. Honey, Henry Grussing. *Counter Man:* Stanley H. Lay

AREA SERVED — Southern California, Arizona, New Mexico, Southern Nevada

***RIDDELS THEATRE SUPPLY**
1543 Fifth Ave., San Diego

NATIONAL THEATRE SUPPLY
255 Golden Gate Ave., San Francisco 2
Telephone: MArket 1-4171

PERSONNEL—*Manager:* Heaton Randall

AREA SERVED — Northern California, Nevada, Southern Oregon

***PACIFIC COAST THEATRE SUPPLY CO.**
250 Golden Gate Ave., San Francisco

WALTER G. PREDDEY
187 Golden Gate Ave., San Francisco 2
Telephones: UNderhill 1-7571-2 — (Emergency Night) BAyview 1-5749

PERSONNEL—*Owner:* Walter G. Preddey. *Manager:* Robert O. Bemis. *Salesmen:* Mr. Ryan, H. C. Graywood

AREA SERVED—California, Nevada, Oregon, Arizona, Hawaii, Alaska

C. R. SKINNER MFG. CO.
294 Turk St., San Francisco

PERSONNEL—R. E. Pinkham, 1061 Fremont St., Santa Clara; Chas. Stanyan, 182 El Dorado St., Monterey; Al Finley, 234 Eucalyptus Drive, Salinas; John Stoker, 38 Ford St., Watsonville; J. P. Miller, P. O. Box 145, Gilroy; James W. Wilson, 228 Peyton St., Santa Cruz

AUTHORIZED DEVRY DEALER

Distributors for
DeVRY Motion Picture Projectors and Sound Systems
DeVRY In-Car Speakers and "Brilliante" Lenses
HANCOCK Tickets
NEUMADE Products
NATIONAL Carbons
Slides, made to order
Motion Picture Trailers, made to order
Spot Lights
Screens
Drapes



NEW DeVRY "12000" THEATER PROJECTOR

Your Best Buy—DeVRY



Your RCA THEATRE SUPPLY DEALER Has

BRENKERT Projectors
RCA Sound Systems
BRENKERT Arc Lamps
WESTINGHOUSE Lamps
RECTIGONS

INTERNATIONAL Chairs
MOHAWK Carpets
DRIVE-IN Equipment
SNOWHITE Screens
ALLEN Carpet Lining

CENTURY ROTH Generators
RCA Copper-Oxide Rectifiers
RCA Tube-Type Rectifiers
RCA Speaker Systems
GORDOS Rectifier Bulbs

Everything for the Theatre!

B. F. SHEARER COMPANY
243 Golden Gate Ave., San Francisco 2
Telephone: UNderhill 1-1816
PERSONNEL — *Manager:* H. I. Tegtmeier. *Salesmen:* Wesley Rosenthal, Gordon Morris, Eddie Albin. *Counter Man:* T. L. Shearer, Jr.
AREA SERVED — Northern California, Nevada, Southern Oregon, Hawaii

WESTERN THEATRICAL EQUIPMENT CO.
337 Golden Gate Ave., San Francisco 2
Telephone: Hemlock 8302
PERSONNEL — *President and Manager:* Harry Sarber
AREA SERVED—California, Nevada, Idaho, Arizona, Utah

COLORADO

***GRAHAM BROTHERS**
546 Lincoln St., Denver 9
Telephone: TAbor 5467
PERSONNEL—*Owners:* J. M. and H. W. Graham
AREA SERVED—Colorado, New Mexico, Wyoming, Nebraska, and Black Hills of South Dakota

***SERVICE THEATRE SUPPLY CO.**
2054 Broadway, Denver 2
Telephone: East 4928
AREA SERVED—Denver Film Territory

WESTERN SERVICE & SUPPLY
2120 Broadway, Denver 2
Telephone: KE 8041
PERSONNEL—*Manager:* Sam Langwith. *Office Manager:* Jean Gerbase
AREA SERVED—Denver Exchange Territory

NATIONAL THEATRE SUPPLY
2111 Champa St., Denver 2
Telephones: Tabor 0201 — (Emergency Night) Pearl 8418
PERSONNEL—*Co-Managers:* Jasper J. Morgan and Joe B. Stone. *Salesman:* J. Richard Lutz
AREA SERVED—Colorado, New Mexico, Wyoming, Western Nebraska, Eastern Montana, and Black Hills of South Dakota

CONNECTICUT

LOU PHILLIPS THEATRE SUPPLIES, INC.
130 Meadow St., New Haven 10
Telephones: 7-4579 — (Emergency Night) 5-4774
PERSONNEL—*Owner:* Louis Phillips, *Pres. Manager:* George Comden, *Secty. and Treas.*
AREA SERVED—Connecticut

NATIONAL THEATRE SUPPLY
122 Meadow St., New Haven 10
Telephone—5-7371
PERSONNEL—*Manager:* William J. Hutchins. *Salesman:* Frederick Dandio
AREA SERVED—Connecticut

DISTRICT OF COLUMBIA

***BEN LUST THEATRE SUPPLY CO.**
1001 New Jersey Ave., N. W., Washington 1

ELMER H. BRIENT & SONS THEATRE EQUIP.
12 "H" Street, N. E., Washington
Tel.: District 5905—Wisconsin 1453
PERSONNEL—*General Manager:* Elmer H. Brient. *Office Manager:* Ted C. Brient. *Sales:* Robert H. Brient. *Salesmen:* Blain Short, J. K. Sherrod, Herman Holloway. *Repairs and Service:* Robert Gollohon. *Air Conditioning and Consulting Engineer:* C. L. Rakow. *Counter:* Jerry Barbar
AREA SERVED — District of Columbia, Maryland, Virginia, Northeastern W. Virginia, Delaware

RCA THEATRE SUPPLY DEALER

Everything for the Theatre and we do mean EVERYTHING

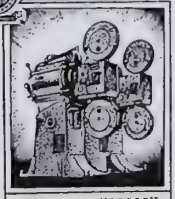
Sales and Service on—
RCA SERVICE (Booth)
RCA PHOTOPHONE SOUND
RCA SNOWWHITE & SILVERLITE SCREENS
BRENKERT PROJECTORS
LENSES • GENERATORS • LAMPS
SPOTLIGHTS • STAGE DRAPES • TRACKS
DECORATING, LIGHTING, AIR CONDITIONING
HEATING • VENTILATING • BLOWERS
REFRIGERATION • SEATS • STAIR & LOBBY MATS • FLOOR COVERING • LOBBY FRAMES
MARQUEES • DECORATIVE FRONTS
TICKET REGISTERS • CHANGEMAKERS
MOHAWK CARPETS • RECTIFIERS
COMPLETE LINE OF SUPPLIES
POPCOR NMACHINES
REPAIRS & SERVICE • CARBONS • TICKETS
Dependable Consultation, Design, Engineering and Equipment

FLORIDA

UNITED THEATRE SUPPLY CORP.
110 N. Franklin St., Tampa 1
Telephone: M-3045
PERSONNEL — *Pres. and Treas.:* Ray Busler. *Secretary:* Edna L. Worth. *Service Engineers:* Huey Marsh, William Bell. *Counter Man:* S. W. Smith
AREA SERVED—Florida, South Georgia, Cuba and the Bahamas

AUTHORIZED DEVRY DEALER

Distributors for
DeVRY Motion Picture Projectors and Sound Systems
DeVRY In-Car Speakers and "Brilliante" Lenses
STRONG Arc Lamps
STRONG Rectifiers
ROBIN-IMPERIAL Stedypower Generators
VALLEN Curtain Control
IRWIN Chairs
National Carbons
GENERAL REGISTER Ticket Machines
BIGELOW-SANFORD Carpets
Specialists in Repairing All Types of Sound Systems



NEW DeVRY "12000" THEATER PROJECTOR

Your Best Buy — DeVRY

SOUTHEASTERN THEATRE EQUIP. CO.
625 W. Bay Street, Jacksonville
Telephone: 4-3443
PERSONNEL — *President and General Manager:* J. B. Dumestre, Jr. *Asst. General Manager:* Fred Bearden, Jr. *Manager:* Walter Woodward
"Covering the Southeastern Area"

RCA THEATRE SUPPLY DEALER

Complete Sales and Service
BRENKERT Projectors and Lamps • CENTURY Roth Motor Generator Sets • RCA Tube Rectifiers • RCA Sound Systems • RCA Snowhite Sound Screens • Bausch and Lomb Lens • International All Steel Chairs • Mohawk Carpets and Allen Carpet Lining • U. S. Airco Ventilating and Refrigeration • Westinghouse Mazda Lamps • National Carbons
Theatre Lighting Fixtures
AND
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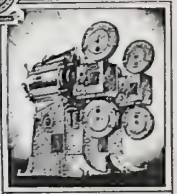
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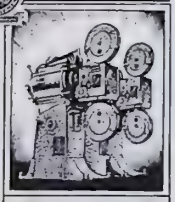
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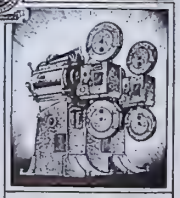
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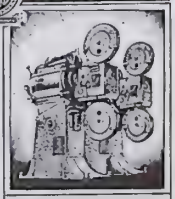
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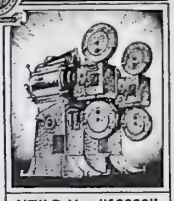
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Solis 427, Buenos Aires
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Maipu 639, Buenos Aires
Products Sold: DeVry

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Products Sold: Gaumont-Kalee

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Products Sold: Gaumont-Kalee

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Products Sold: Westrex Corp. (formerly Western Electric Export) line

WESTERN ELECTRIC CO. (AUSTRALIA), PTY., LTD.
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Products Sold: Westrex Corp. (formerly Western Electric Export) line

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Products Sold: Raycophone Sound and Projection Equipment
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NATIONAL THEATRE SUPPLY CO. OF AUSTRALASIA, PTY., LTD.
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OSSA & MAX
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PERSONNEL—Fred Jones
Products Sold: RCA Export Line

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88 Museum Rd., Shanghai
Products Sold: Westrex Corp. (formerly Western Electric Export) line

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Products Sold: National Theatre Supply Export Line and RCA Export Line

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Products Sold: RCA Export Line

PAN AMERICAN TRADING CO., LTD.
Apartado 2018, San Jose
PERSONNEL—*Owner:* Francisco Pena. *Manager:* Francisco Pena
Products Sold: National Theatre Supply Export Line
AREA SERVED—Nicaragua, Honduras, Guatemala, Salvador, Costa Rica

JOSE RAVENTOS
Apartado 1147, San Jose
Products Sold: RCA Export Line

CUBA

***ANTIGA CO., S.A.**
Oficina y Salon de Ventas, Obispo No. 153, Habana
PERSONNEL—*Vice-President:* Enrique Antiga
Products Sold: N. V. Philip's Line, Holland

NATIONAL THEATRE SUPPLY OF CUBA, S.A.
Consulado 112, Habana
PERSONNEL—P. Saenz
Products Sold: National Theatre Supply Export Line

***J. F. SAN ROMAN**
J. A. Saco 204, Habana

SELECT CINEMA SUPPLY
113 Trocadero St., Habana
PERSONNEL—Sanchez y Victoria
Products Sold: De Vry, Ballantyne, and Miscellaneous

STANDARD ELECTRIC, S.A. OF CUBA
Trocadero 163, Habana
Products Sold: RCA Export Line

WESTERN ELECTRIC CO. (CARIBBEAN)
Industria 307, Habana
Products Sold: Westrex Corp. (formerly Western Electric Export) line

CURACAO

MARCHENA-MORON & CO.
P. O. Box 13, Curacao, N. W. 1
Products Sold: National Theatre Supply Export Line
AREA SERVED—Curacao

DENMARK

BANG & OLUFSON
Jernbanegade 4, Copenhagen
PERSONNEL—L. A. O. Hansen
Products Sold: National Theatre Supply Export Line

WESTERN ELECTRIC CO., A/S
Vesterport 481, Copenhagen
Products Sold: Westrex Corp. (formerly Western Electric Export) line

DOMINICAN REPUBLIC

***AGENCIAS UNIDAS DOMINICANAS, C. POR A.**
Arzobispo Merino 113, Ciudad Trujillo

FERNANDEZ & CIA
Apartado 826, Ciudad Trujillo
Products Sold: RCA Export Line

JOAQUIN GINEBRA
Apartado 834, Ciudad Trujillo
Products Sold: National Theatre Supply Export Line
AREA SERVED—Dominican Republic

DUTCH GUIANA

SURINAAMSCHE RADIO HANDEL
P. O. Box 609, Paramaribo, Suriname, Dutch Guiana
Products Sold: RCA Export Line

ECUADOR

SOCIEDAD RADITECNICA ECUATORIANA
Apartado 414, Quito
PERSONNEL—*Owner and Director:* Luigi Rota. *Manager:* Marcello Cameo
Products Sold: National Theatre Supply Export Line and RCA Export Line
COUNTRY SERVED—Ecuador

EGYPT

ISIDORE LEVY
22 Bis, Avenue Fouad 1st, Alexandria
Products Sold: Projection Equipment

W. A. LANCASTER
(Selo Stores)
34, Fouad St., Alexandria
Products Sold: Projection, Lighting and Amplifying Equipment; Photographic Supplies

NORTH EAST AFRICA TRADING CO., S.A.E.
Head Office: 31 Rue Cherif Pacha, Alexandria
Cinema Dept.: 23 Sh. Amin Pacha Sami (Kasr el Ani), Cairo
PERSONNEL—*Manager:* H. Temchine
Products Sold: National Theatre Supply Export Line
COUNTRIES SERVED — Africa, Egypt, and Anglo-Egyptian Sudan

WESTERN ELECTRIC CO. (NEAR EAST)
22 (Bloc C) Rue Fouad Ier, Alexandria
Products Sold: Westrex Corp. (formerly Western Electric Export) line
COUNTRIES SERVED — Egypt, Greece, Iran, Iraq, Arabia, Abyssinia, Eritrea, Aden; Italian, French, and British Somaliland; Syria, Lebanon, Palestine

ELECTRICAL ENGINEERING OFFICE
Taher El-Lozy Bey, 21 Soliman Pasha St., Cairo
Products Sold: RCA Export Line

***GREEN & CO.**
147 Mohamed Bey Farid St., Cairo
Products Sold: Gaumont-Kalee, De Vry

W. A. LANCASTER
(Selo Stores)
4, Haret Soufi (Sharia Adly Pacha), Cairo
Products Sold: Projection, Lighting and Amplifying Equipment; Photographic Supplies

NORTH EAST AFRICA TRADING CO., S.A.E.
23 Sharia Amin Pacha Sami, Cairo
PERSONNEL—H. Temchine
Products Sold: National Theatre Supply Export Line

WESTERN ELECTRIC CO. (NEAR EAST)
9 Sharia Tewfick, Cairo
Products Sold: Westrex Corp. (formerly Western Electric Export) line

ENGLAND

J. FRANK BROCKLISS, LTD.
27 John Bright St., Birmingham
Products Sold: National Theatre Supply Export Line

J. FRANK BROCKLISS, LTD.
67 Brittania House, Wellington St., Leeds
Products Sold: National Theatre Supply Export Line

J. FRANK BROCKLISS, LTD.
167/169 Wardour St., London, W1
PERSONNEL — *Owner:* J. Frank Brockliss. *General Manager:* F. E. Durban
Products Sold: National Theatre Supply Export Line
COUNTRIES SERVED—All of Europe

RCA PHOTOPHONE, LTD.
43 Berkeley Square, London, W1
Products Sold: RCA Export Line

WESTERN ELECTRIC CO., LTD.
Liberty House, Regent St., London, W1
Products Sold: Westrex Corp. (formerly Western Electric Export) line

WESTERN ELECTRIC CO., LTD.
152 Coles Green Road, Cricklewood, London, NW2
Products Sold: Westrex Corp. (formerly Western Electric Export) line

WESTERN ELECTRIC CO., LTD.
Wellington Chambers, Wellington Street, Leeds 1
Products Sold: Westrex Corp. (formerly Western Electric Export) line

J. FRANK BROCKLISS, LTD.
3 The Parsonage, Manchester
Products Sold: National Theatre Supply Export Line

WESTERN ELECTRIC CO., LTD.
1 North Parade, Manchester 3
Products Sold: Westrex Corp. (formerly Western Electric Export) line

CROWE & CO., LTD.
52 Stowell St., Newcastle-on-Tyne
Products Sold: National Theatre Supply Export Line

WESTERN ELECTRIC CO., LTD.
1 Charlotte Sq., Newcastle-on-Tyne 1
Products Sold: Westrex Corp. (formerly Western Electric Export) line

WESTERN ELECTRIC CO., LTD.
Angel Row, Nottingham
Products Sold: Westrex Corp. (formerly Western Electric Export) line

WESTERN ELECTRIC CO., LTD.
367A Bearwood Rd., Smethwick, Staffs., Birmingham
Products Sold: Westrex Corp. (formerly Western Electric Export) line

FINLAND

THE SWEDISH WESTERN ELECTRIC CO., AKTIEBOLAG
Johannesbrinken 1-B, 1-46, Helsinki
Products Sold: Westrex Corp. (formerly Western Electric Export) line

G. W. BERG & CO.
14 Fabiangstan, Helsinki
Products Sold: National Theatre Supply Export Line and RCA Export Line

FRANCE

WESTERN ELECTRIC CO.
23 Cours Joseph Thierry, Marseilles
Products Sold: Westrex Corp.(formerly Western Electric Export) line

BROCKLISS SIMPLEX S.A.
6 Rue Guillaume Tell, Paris
PERSONNEL—*Manager:* Albert Gillet
Products Sold: National Theatre Supply Export Line
COUNTRIES SERVED—France, French North Africa, Switzerland

D. G. FISCHEL FILS
39 Rue de Tangier, Paris 19
Products Sold: Theatre Seats

PATHE CINEMA, S.A.
6 Rue Francoeur, Paris 18c
PERSONNEL—P. Vidal
Products Sold: RCA Export Line

ROTATICKETS, S.A.
Cosne (Nievre), Paris
Products Sold: Theatre Tickets

SOCIETE des CINE-THEATRES d'INDOCHINE
34 Avenue Hoche, Paris 8
Products Sold: RCA Export Line

WESTERN ELECTRIC CO. (FRANCE)
120 Avenue des Champs Elysees, Paris
Products Sold: Westrex Corp. (formerly Western Electric Export) line

GREECE

CHARILAOS PETROPOULOS
51 University St., Athens
Products Sold: RCA Export Line

SPYROS D. SKOURAS
5 Santarosa St., Athens
Products Sold: National Theatre Supply Export Line

GUATEMALA

ADOLFO RIOS
P. O. Box 97, Guatemala City
Products Sold: RCA Export Line

E. F. TOPPE
Callejor Castillo No. 7, Guatemala City
Products Sold: Westrex Corp. (formerly Western Electric Export) line
COUNTRIES SERVED — Guatemala, El Salvador, Honduras, and British Honduras

HAITI

SOCIETE HAITIENNE d'AUTOMOBILE
Mallenbranche, Gentil Bogat & Co., Port-au-Prince
Products Sold: RCA Export Line

HAWAII

CONSOLIDATED AMUSEMENT CO., LTD.
Hawaii Theatre Bldg., Honolulu
PERSONNEL — *Manager Merchandise Department:* J. A. Madden
Products Sold: National Theatre Supply Projection, RCA Sound, Heywood-Wakefield Seats

HONDURAS

ESTEVEZ Y LAZARUS CLAMER
Apartado Postal 110, Tegucigalpa
Products Sold: RCA Export Line

ICELAND

SNORRI P. B. ARNAR
Reykjavik
Products Sold: RCA Export Line

G. SIGMUNDSSON
Hafnarstraeti, 19-12, Reykjavik
Products Sold: Westrex Corp. (formerly Western Electric Export) line

INDIA

EVERGREEN PICTURES
Post Box No. 3515, Bombay 4, India
PERSONNEL—S. N. Kotwal
Products Sold: National Theatre Supply Export Line
COUNTRIES SERVED—India, Burma, Ceylon

PHOTOPHONE EQUIPMENTS, LTD.
9, Marine Lines, P. O. Box 394, Bombay, India
PERSONNEL—M. A. Fazalbhoy
Products Sold: RCA Export Line, National Theatre Supply Export Line
COUNTRIES SERVED—India, Burma, Ceylon

WESTERN ELECTRIC CO. OF INDIA
Metro House, Esplanade Road, Bombay 2, India
Products Sold: Westrex Corp. (formerly Western Electric Export) line
AREAS SERVED — India, Pakistan, Burma, Ceylon

PHOTOPHONE EQUIPMENTS, LTD.
98-E, Central Avenue, South, Calcutta, India
Products Sold: RCA Export Line, National Theatre Supply Export Line, Strong Lamps and Rectifiers, International Seats

WESTERN ELECTRIC CO. OF INDIA
Lighthouse Cinema Bldg., Calcutta, India
Products Sold: Westrex Corp. (formerly Western Electric Export) line

CENTRAL TALKIE EQUIPMENT CO.
703 Chandni Chowk, Delhi
Products Sold: National Theatre Supply Export Line

EMPIRE TALKIE DISTRIBUTORS
Behind Imperial Bank, Chandni Chowk, Delhi
Products Sold: RCA Export Line

PHOTOPHONE EQUIPMENTS, LTD.
Chandni Chowk, Behind Imperial Bank, Delhi
Products Sold: RCA Export Line, National Theatre Supply Export Line, Strong Lamps and Rectifiers, International Seats

*Listing not confirmed by Supply Dealer

WESTERN ELECTRIC CO. OF INDIA
3/A Court Lane, Delhi
Products Sold: Westrex Corp. (formerly Western Electric Export) line

WESTERN ELECTRIC CO. OF INDIA
82 Nerbudda Rd., Jubbulpore, India
Products Sold: Westrex Corp. (formerly Western Electric Export) line

EMPIRE TALKIE DISTRIBUTORS
P. O. Box 644, Karachi
Products Sold: National Theatre Supply Export Line

PHOTOPHONE EQUIPMENTS, LTD.
Near Denso Hall, Bunder Rd., Karachi
Products Sold: RCA Export Line, National Theatre Supply Export Line, Strong Lamps and Rectifiers, International Seats

WESTERN ELECTRIC CO. OF INDIA
Fikree Mansions No. 1, Room 18, Hassa Singhadvani St., Karachi
Products Sold: Westrex Corp. (formerly Western Electric Export) line

PHOTOPHONE EQUIPMENTS, LTD.
The Mall, Lahore
Products Sold: RCA Export Line, NTS Export Line, Strong Lamps and Rectifiers, International Seats

WESTERN ELECTRIC CO. OF INDIA
48 Lawrence Rd., Lahore
Products Sold: Westrex Corp. (formerly Western Electric Export) line

PHOTOPHONE EQUIPMENTS, LTD.
1/18 Mount Rd., Madras, India
Products Sold: RCA Export Line, NTS Export Line, Strong Lamps and Rectifiers, International Seats

WESTERN ELECTRIC CO. OF INDIA
9 Monteith Lane, Egmore, Madras, India
Products Sold: Westrex Corp. (formerly Western Electric Export) line

IRAN

IRAN INDUSTRIAL & COMMERCIAL CO., LTD.
233 Sevom Estand, Terehan
Products Sold: RCA Export Line

IRAQ

HAFIDH AL-KADI
Al-Rashid St., Baghdad
Products Sold: RCA Export Line

IRELAND (EIRE)

CENTURY MACHINERY STORES, LTD.
70 Middle Abbey St., Dublin
PERSONNEL—*Manager:* Maurice Baum
Products Sold: National Theatre Supply Export Line

WESTERN ELECTRIC CO., LTD.
Veritas House, 7 and 8 Lower Abbey St., Dublin
Products Sold: Westrex Corp. (formerly Western Electric Export) line

ITALY

TELONDA INTERNATIONAL CORP.
Viale Vittorio Veneto 24, Milan
PERSONNEL—*Technical Director:* Dr. A. Banfi
Products Sold: RCA Export Line

WESTERN ELECTRIC CO. OF ITALY
Piazza Lovatelli 1, Rome
Products Sold: Westrex Corp. (formerly Western Electric Export) line

JAMAICA

PALACE AMUSEMENT CO., LTD.
P. O. Box 211, Kingston
PERSONNEL—B. A. Richards
Products Sold: National Theatre Supply Export Line

JAVA

WESTERN ELECTRIC CO. OF ASIA
Tanah Abang West 2, Batavia-Centrum, Java, Netherlands East Indies
Products Sold: Westrex Corp. (formerly Western Electric Export) line

LEBANON

WILLIAM MALLUK
Avenue Allenby, Beyrouth
Products Sold: National Theatre Supply Export Line
COUNTRIES SERVED—Syria, Lebanon

NICHOLAS J. PRELORENZO
Rue Botros Karamco, Immeuble Sokolovitch, P. O. Box 341, Beyrouth
Products Sold: Westrex Corp. (formerly Western Electric Export) line

TUFFY TRADING CO.
Rue Saad Zaghlowl, Beyrouth
PERSONNEL—*President:* K. G. Tutenkdjian
Products Sold: RCA Export Line

MALAYAN UNION

SHAW BROTHERS LTD.
Malayan Theatres, Ltd., 116 Robinson Rd., Singapore

MALAYA SIAM THEATRE ENTERPRISE
235 Orchard Road, Singapore
Products Sold: RCA Export Line

***H. A. O'CONNOR & CO.**
Singapore
Products Sold: Gaumont-Kalee

WESTERN ELECTRIC CO. OF ASIA
46 Orchard Road, Singapore
Products Sold: Westrex Corp. (formerly Western Electric Export) line
COUNTRIES SERVED—Malay Union, Netherland East Indies, Siam

MALTA

GENERAL SALES COMPANY
26 Tower Road, Sliema
Products Sold: National Theatre Supply Export Line and RCA Export Line

MARTINIQUE

RENE DIDIER
Fort de France
Products Sold: National Theatre Supply Export Line

MEXICO

***A.E.G. CIA. MEXICANA DE ELECTRICIDAD, S.A.**
5 de Mayo No. 10, Mexico, D.F.

***CASA EHLERS**
Abraham Gonzalis No. 4, Mexico, D.F.
PERSONNEL — *Owners:* Adriana Ehlers, Dolores Ehlers

EQUIPOS PARA CINES, S.A.
Artes, 13-A, Mexico, D.F.
PERSONNEL—*Manager:* Manuel Ampudia
Products Sold: National Theatre Supply Export Line

***GERMAN CAMUS Y CIA**
Belisario Dominguez No. 10, Mexico, D.F.

***GENERAL ELECTRIC, S.A.**
San Juan de Letran y Articulo, Mexico, D.F.

F. MIER Y HNO., S.A.
Ave. Morelos No. 37, Mexico, D.F.
PERSONNEL—*Owner and Manager:* Felipe Mier
Products Sold: RCA and Miscellaneous
AREA SERVED — Mexico, D.F.; Havana, Cuba; Caracas, Venezuela; Lima, Peru

RCA-VICTOR MEXICANA, S.A.
Calzada Villalongin No. 196, Mexico, D.F.
PERSONNEL—*Manager:* John A. Miguel
Products Sold: RCA Export Line
COUNTRY SERVED — Entire Republic of Mexico

WESTERN ELECTRIC CO. OF MEXICO
Paseo de la Reforma 503, Mexico, D.F.
Products Sold: Westrex Corp. (formerly Western Electric Export) line

***JULIO G. GARCIA**
Av. Colon 125, Quadalajara, Jalisco

***ALFONSO HERRERA**
Av. 16 de Septiembre 237, Desp. 10, Quadalajara, Jalisco

ALUMBRADO Y NOVADADES, S.A.
5 de Mayo Oriente 536, Monterrey, Nuevo Leon

***LAMAR ROUGHTON**
Morelos Oriente 859, Monterrey, Nuevo Leon

***TARNAVA Y CIA**
Padre Mier 215, Monterrey, Nuevo Leon

***CIRCUITO DEL PACIFICO, S.A.**
M. Escobedo 352, Mazatlan, Sinaloa

***EMIGDIO ALVAREZ**
Mazatlan, Sinaloa

***COMPANIA FOTOGRAFICA YUCATECA**
512 Calle 63, Merida, Yucatan

MOROCCO

ELIAS BENDRIHEM
33 Rue D'Italia, Tangier, Morocco
Products Sold: RCA Export Line

NETHERLANDS

BICKER & VON der ROER
Sarphat Kade 4, Amsterdam
Products Sold: National Theatre Supply Export Line

N. V. KINOTECHNIEK
530 Innsengracht, Amsterdam C
Products Sold: Gaumont-Kalee

NEDERLANDSCHE WESTERN ELECTRIC, N.V.
Singel 170, Amsterdam
Products Sold: Westrex Corp. (formerly Western Electric Export) line

FIRMA ERVEN & CO.
Heuvel A26, Oirschot
Products Sold: Theatre Chairs

NEDERLANDSCHE SPECIAAL DRUKKERIJEN C.V.
Rochussenstraat 125, Rotterdam C.
Products Sold: Mfr. of "Rolca" Ticket Machine

NICARAGUA

H. M. BECKLIN CO., LTD.
Gran Hotel, Managua
Products Sold: Westrex Corp. (formerly Western Electric Export) line

RAFAEL CABRERA
Managua
Products Sold: RCA Export Line

NEW ZEALAND

P. C. BLENKARNE, LTD.
Chancery Bldg., 16 O'Connell St., Auckland
PERSONNEL—*Owner:* P. C. Blenkarne. *Manager:* J. C. Spooner
Products Sold: National Theatre Supply Export Line
COUNTRY SERVED—New Zealand

WESTERN ELECTRIC CO. (N. Z.), LTD.
Queen St., Auckland
Products Sold: Westrex Corp. (formerly Western Electric Export) line

WESTERN ELECTRIC CO. (N. Z.), LTD.
Colombo St., Christchurch
Products Sold: Westrex Corp. (formerly Western Electric Export) line

P. C. BLENKARNE, LTD.
8 Victoria St., P. O. Box 1175, Christchurch
Products Sold: National Theatre Supply Export Line

WESTERN ELECTRIC CO. (N. Z.), LTD.
Empire Theatre, Dunedin
Products Sold: Westrex Corp. (formerly Western Electric Export) line

WESTERN ELECTRIC CO. (N. Z.), LTD.
Regent St., Hamilton
Products Sold: Westrex Corp. (formerly Western Electric Export) line

P. C. BLENKARNE, LTD.
Magnus Bldg., Wakefield St., Wellington
Products Sold: National Theatre Supply Export Line

* Listing not confirmed by Supply Dealer

WESTERN ELECTRIC CO. (N. Z.), LTD.
Dental and Medical Supply Bldg., 128 Wakefield St., Wellington
Products Sold: Westrex Corp. (formerly Western Electric Export) line

NORWAY

ELEKTRO-GENERATOR AKSJESELSKAP
Ovre Vollgt 11, Oslo
Products Sold: RCA Export Line

J. L. NERLIEN A/S
13 Nedreslottsgate, Oslo
PERSONNEL—Knut Hellam
Products Sold: National Theatre Supply Export Line

PALESTINE

AMPA, LTD.
P. O. Box 636, Tel-Aviv
PERSONNEL — *Theatre Department Manager:* M. Kolari
Products Sold: National Theatre Supply Export Line
COUNTRIES SERVED — Palestine and Trans-Jordan

CARASSO BROTHERS
P. O. Box 364, Tel-Aviv
Products Sold: RCA Export Line

PANAMA

PANAMA RADIO CORP.
P. O. Box 406, Panama City
PERSONNEL—A. Bletterman
Products Sold: National Theatre Supply Export Line and RCA Export Line

WESTERN ELECTRIC CO. (CARIBBEAN)
Calle 31, No. 28, Panama City
Products Sold: Westrex Corp. (formerly Western Electric Export) line
COUNTRIES SERVED—Panama, Canal Zone

PERU

J. CALERO PAZ, S.A.
Portal de Belen No. 102/114, Lima
PERSONNEL—*Manager:* J. Calero Paz
Products Sold: National Theatre Supply Export Line and RCA Export Line
COUNTRY SERVED—Peru

WESTERN ELECTRIC CO. (ANDEAN)
Edificio Hidalgo No. 150 y 154, Plaza San Martin, Lima
Products Sold: Westrex Corp. (formerly Western Electric Export) line
COUNTRIES SERVED — Peru, Bolivia and Ecuador

PHILIPPINE ISLANDS

S. M. BERGER AND CO., INC.
2219 Azcarraga St., Manila
Products Sold: National Theatre Supply Export Line

PHILIPPINE ELECTRONIC INDUSTRIES
Regina Bldg., Maelle del Banco Nacional, Manila
Products Sold: RCA Export Line

WESTERN ELECTRIC CO. OF ASIA
675 Florentino Torres, Manila
Products Sold: Westrex Corp. (formerly Western Electric Export) line

PORTUGAL

INSTITUTO PASTEUR de LISBOA
R. Nova de Almada 69, Lisbon
Products Sold: RCA Export Line

PUERTO RICO

PUERTO RICO IRON WORKS, INC.
Real St., Ponce
Products Sold: RCA Export Line

EDUARDO G. GONZALEZ
P. O. Box 3871, San Juan
PERSONNEL—*Owner and Manager:* Eduardo G. Gonzalez
Products Sold: National Theatre Supply Export Line
AREA SERVED—Puerto Rico

MUXO & SALGADO
Recinto Sur St. No. 323, P. O. Box 4806, San Juan
Telephone: 2-5271
PERSONNEL—*Partners:* H. R. Muxo, Jose G. Salgado
Products Sold: De Vry and Miscellaneous

WESTERN ELECTRIC CO. (CARIBBEAN)
Film Center Bldg., San Juan
Products Sold: Westrex Corp. (formerly Western Electric Export) line
AREA SERVED—Puerto Rico, Haiti, Dominican Republic, Virgin Islands

SALVADOR

CARLOS AVILA
Calle Delgado y 6a, Avenida Norte, San Salvador
Products Sold: RCA Export Line

SCOTLAND

J. FRANK BROCKLISS, LTD.
181 Howard St., Glasgow
Products Sold: National Theatre Supply Export Line

WESTERN ELECTRIC CO., LTD.
141 Bath St., Glasgow C. 2
Products Sold: Westrex Corp. (formerly Western Electric Export) line

SOCIETY ISLANDS

ETABLISSEMENTS BALDWIN
Boite Postal 119, Papeete, Tahiti
Products Sold: RCA Export Line

SPAIN

REY SORIA FILMS
Calle Mayor 6, Madrid
Products Sold: RCA Export Line

S. I. G. E.
Zurbard 14, Madrid
PERSONNEL—Maxemo Hessel
Products Sold: National Theatre Supply Export Line

WESTERN ELECTRIC CO. OF SPAIN
Plaza Cataluna 22, Barcelona
Products Sold: Westrex Corp. (formerly Western Electric Export) line
COUNTRIES SERVED — Spain, Portugal and Gibraltar

SWEDEN

***AKTIEBOLAGET FOTOEGENTUREN**
Stockholm
Products Sold: Gaumont-Kalee

FOTO AB SKANDIA
Kung gotan 24, Stockholm
PERSONNEL—Henry Holni
Products Sold: National Theatre Supply Export Line

THE SWEDISH WESTERN ELECTRIC CO., AKTIEBOLAG
Sveavagen 25-27, Stockholm
Products Sold: Westrex Corp. (formerly Western Electric Export) line
COUNTRIES SERVED — Sweden, Norway and Finland

SWITZERLAND

ALPINE WESTERN ELECTRIC CO.
60 Viadukstrasse, Basle
Products Sold: Westrex Corp. (formerly Western Electric Export) line

JACQUES BAERLOCHER CORP. FOR ELECTRONIC PRODUCTS
Haus am Kreuzplatz, Forchstrasse 2, Zurich
Products Sold: RCA Export Line

TASMANIA

WESTERN ELECTRIC CO. (AUSTRALIA), PTY., LTD.
38 Elizabeth St., Hobart
Products Sold: Westrex Corp. (formerly Western Electric Export) line

THAILAND (SIAM)

SHAW BROS., LTD.
Capitol Cinema Bldg., New Road, Bangkok
Products Sold: National Theatre Supply Export Line

TRINIDAD

GENERAL SUPPLIES, LTD.
28 Henry Street, Port of Spain
PERSONNEL—*Manager:* Isaac N. Akow
Products Sold: RCA Export Line
TERRITERIES SERVED—Trinidad, all of British West Indies, including British Guiana

GLOBE THEATRES, LTD.
Port of Spain
Products Sold: National Theatre Supply Export Line

NATIONAL UNION RADIO SERVICE
9 Corniles St., Port of Spain
PERSONNEL — *Owner and Manager:* J. H. Fung
Products Sold: National Theatre Supply Export Line
TERRITORIES SERVED — Trinidad, British Guiana, Venezuela

WESTERN ELECTRIC CO. (CARIBBEAN)
9-11 Edward St., P. O. Box 161, Port of Spain
Products Sold: Westrex Corp. (formerly Western Electric Export) line
COUNTRIES SERVED — Trinidad, Barbados, Guianas, Leeward and Winward Islands

TURKEY

***KEMAL & CHAKIR SEDEN FRERES**
Beyoglu, Istanbul
Products Sold: Gaumont-Kalee

TEKNIKA, S.A.T.
P. O. Box 1153, Istanbul
Products Sold: RCA Export Line

TURK MOTOR ANONIM SIRKETI
Beyoglu Istiklal Cadesi, Istanbul
PERSONNEL—N. Verdi
Products Sold: National Theatre Supply Export Line

UNION OF SOUTH AFRICA

AFRICAN CONSOLIDATED FILMS, LTD.
Box 4552, Johannesburg
PERSONNEL—T. Watson
Products Sold: National Theatre Supply Export Line and RCA Export Line

WESTERN ELECTRIC CO. (NEAR EAST)
96 Main St., Johannesburg
Products Sold: Westrex Corp. (formerly Western Electric Export) line
COUNTRIES SERVED—Union of South Africa, Northern and Southern Rhodesia, Belgian Congo, Portuguese East and West Africa, Tanganyika, Uganda, Kenya Colony, Zanzibar

URUGUAY

CINEMATOGRAFICA GLUCKSMANN, S.A.
Rio Branco 1320-26, Montevideo
PERSONNEL — *Owner and Manager:* Bernardo Glucksmann
Products Sold: National Theatre Supply Export Line and RCA Export Line
COUNTRY SERVED—Uruguay

VENEZUELA

NATIONAL SUPPLY, S.A.
Gorda a Asservadero 32/34, Caracas
PERSONNEL—*Manager:* Jose Castenado
Products Sold: National Theatre Supply Export Line

STANDARD ELECTRIC, S.A.
Bloque 6 Local 6, El Silencio, Caracas
Products Sold: RCA Export Line
COUNTRY SERVED—Venezuela

WESTERN ELECTRIC CO. (CARIBBEAN)
Cipresas a Miracielos No. 1-1, Caracas
Products Sold: Westrex Corp. (formerly Western Electric Export) line

*Listing not confirmed by Supply Dealer

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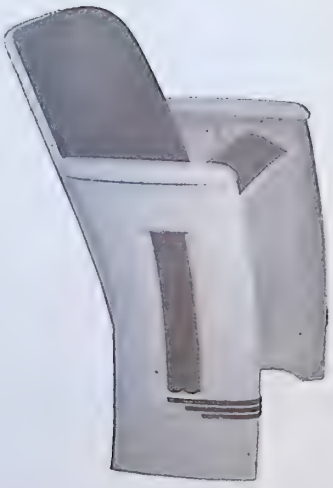
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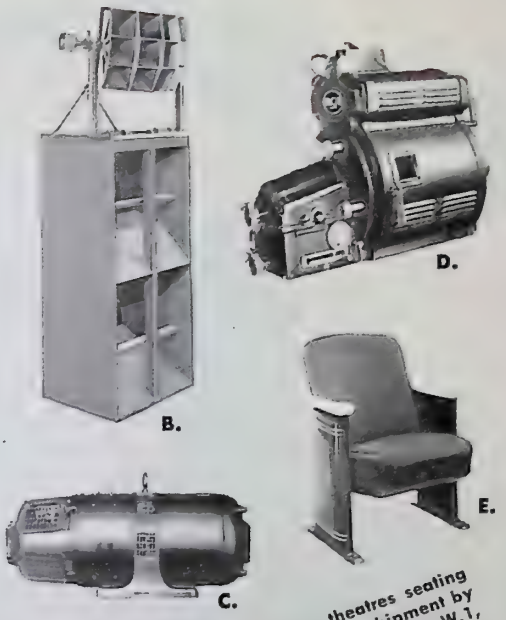
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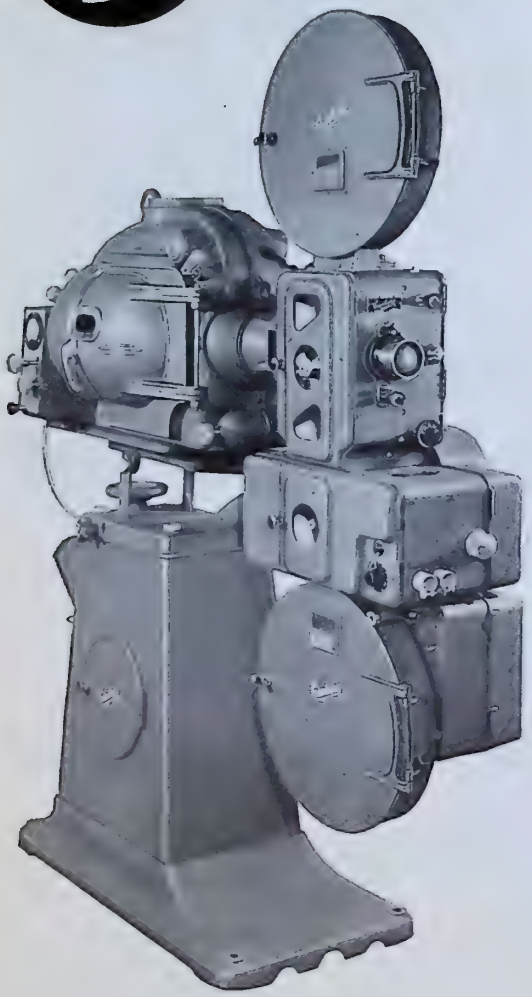
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SERVICES

1947-48

Good Theatre Sound Service Is Not a Luxury

Servicer - Projectionist Is the Combination Hard to Beat in Maintaining Sound Systems

EDWARD STANKO

Technical Section, Theatre Service Division, RCA Service Company, Inc.

Service for theatre sound equipment is not a luxury. It is just as sensible for a thrifty theatre owner to subscribe to a modern theatre sound-service plan as it is for any individual to sign up under one of the many valuable medical care plans that have become so popular. In fact, in some ways the theatre sound-service plan is more advanced. It stresses trouble-preventive services.

The pay-offs under the theatre-service plan are collected daily by the exhibitor in the form of more pleasing sound reproduction from equipment kept adjusted to Academy standards, lessened equipment troubles, fewer emergency calls, and freedom from constant worry over what might happen to the sound equipment. All together, they have a healthy effect in the theatre's life-blood, its box-office receipts.

An exhibitor may ask "Why should I pay for sound equipment service when I have an excellent projectionist to take care of my projection room problems?" This is a natural question for any exhibitor who wants to operate his theatre as economically as is consistent with good business practices.

In many respects, the art of the projectionist may be likened to that of the airplane pilot. The pilot must be highly skilled in all operating techniques. He must know exactly what to do under all circumstances to get the best performance out of his plane. He must know what measures insure maximum safety for his passengers. Although he must be able to recognize the slightest deviation from correct performance, he normally is not expected to handle the intricate testing and adjustment of his engine, automatic pilot, radio communications and radar gear. These services are performed by highly trained specialists.

The primary job of the projectionist is to put on a first-class show. This requires more than a thorough knowledge of the art of projection. It requires that he be familiar with all of the functional operating features of his specific equipment. It means that he must know the location and function of every switch and fuse, both in the apparatus and the booth power distribution panels and circuits. The alert projectionist has these clearly labeled for quick identification and guidance in case of trouble. He familiarizes himself with the various emergency procedures such as switching to an emergency amplifier system, making a quick tube change, or cutting out a defective unit. He learns to recognize the nature of almost any trouble he encounters, as, for example, whether sound distortion is in the print, or whether it is generated by some fault in the reproducing system.

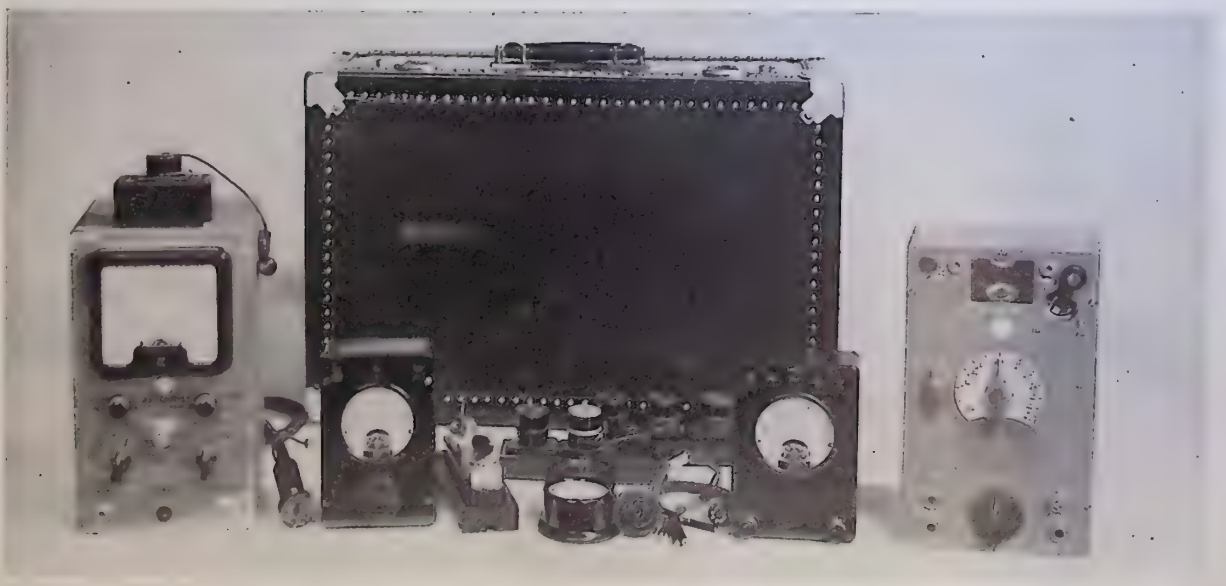
Of course, the projectionist knows that he cannot possibly put on the kind of a show patrons expect of him if he does not keep his equipment in good working order. He knows that he must keep it clean, well lubricated, and otherwise in good operating condition. The first-class projectionist does this without expecting any applause. He knows this is a regular part of his job. But the care of his projector, arc lamps and house lights, the protection of film against damage, and the avoidance of film fire hazards demand practically all of his time and attention. It is hardly fair to expect him also to locate and correct sound trouble in the reproducing system which for all of its simplifications remains a combination of units which are highly sensitive to adjustment.

The old bromide "an ounce of prevention is worth a pound of cure" never had a better application than in the theatre-sound field. High-speed correction of troubles when they do occur is, of course, vital. But a plan that prevents them entirely or catches them in an incipient stage is a lot easier on the nerves of both the projectionist and the man who owns the theatre. That is why a contract service plan puts such heavy stress on "trouble-preventive" service.

The poet Burns said: "The best laid schemes o' mice and men gang aft gang a-gley." So, likewise, trouble may occur even when the most skillfull maintenance and operations are being had. Then, what can the projectionist do?

Well, he cannot very well make a detailed examination of every compo-

THE SERVICER'S SPECIAL TEST KIT embraces a Triatic signal tracer (right), by which it is possible to test a sound system at almost any point; a Volt-Ohmist (left), to provide accurate metering of voltages and circuit resistances; and other essential items in between, all being packed into a convenient carrying case (rear). Other test items include carefully calibrated test reels for frequency and power response tests, as well as reels for making noise and flutter tests. Available are equipments for properly phasing the stage speakers so their outputs properly blend.



nent starting from the exciter lamp and ending with the stage horns. But he can adopt certain simple measures that may clear up his troubles or at least enable him to get by until the service specialist can arrive on the scene with his modern test aids.

But before I talk about these, I would like to make a plea on behalf of the projectionist who finds himself in such an uncomfortable spot. For goodness sake, let him alone as much as you can. It is pretty hard for him to make an intelligent analysis or a critical adjustment to the accompaniment of a jangling telephone or a flow of well-meant but nevertheless disconcerting advice. If you will be calm, he may keep his head and you get your show going quickly.

Of course, we must assume that we are concerned only with a projectionist who has thoroughly acquainted himself with all of the functional operating features of his equipment. If not, he had better start to acquire this familiarity immediately. He may need it.

Another unavoidable assumption is that the projectionist in this situation has had the service representative explain to him the correct way of making ordinary replacements and adjustments, such as replacing and aligning exciter lamps, replacing tubes, checking and adjusting lateral guide rollers, replacing photo-tubes, and the like.

Still another assumption we have to make is that the projectionist we are talking about thoroughly understands the emergency switching provisions of his system. A switch for feeding the full range into the low-frequency loudspeaker when the high frequency coil opens up is of little value if the projectionist does not know where it is, what it is for, or how to use it.

Many of the modern amplifier systems have switching arrangements which enable substituting an auxiliary amplifier for the main system or the by-passing of one amplifier unit. In another case, a portable emergency amplifier system may have been placed in the booth as a feature of the service plan. None of these do much good, if the projectionist doesn't know how to work the switches or connect in the cables.

All this may sound like I am afflicted with a phobia on this matter of knowing the equipment. I am not. If I sound that way, it is merely because I have been sensitized by reports on emergency situations which could have been cleared up more efficiently if the projectionist had really known his equipment.

A projectionist should never hesitate to ask the service representative to explain to him and drill him in all of these normal routine and emergency measures. Just as it is part of the job of the projectionist to know these things, so it is part of the service representative's job to explain them. Only by working together can they deliver the most to the fellow for whom they both work.

Still another slant on this emergency business is the necessity for the projectionist to think through the problem that he is faced with and make accurate, intelligent observations. If he does this, his chances for clearing the trouble without help are immeasurably increased. Secondly, if he can accurately describe the symptoms and situation, he may be able to get telephone advice from the service specialist that will lead to an effective correction.

If this is the kind of a projectionist with whom we are dealing, there is not much we need add. If he has a sound outage on one projector only, he will know how to check the exciter lamp, the photo-tube, all intervening lenses, fader contacts, and so forth, associated with the offending soundhead.

If the trouble affects both soundheads, he will know how to make a quick unit-by-unit, stage-by-stage check with the idea of isolating the trouble. Once he has isolated it, he must know whether he can by-pass the trouble spot or whether he must make a replacement or repair.

A simple illustration will be helpful. The sound from the stage is sour, but the sound from the monitor is perfectly normal. Where does the projectionist look for trouble? First of all, we get back to the knowing the equipment. Is the monitor horn driven by the same amplifier that drives the stage horn? If it is, the trouble is pretty sure to be somewhere in one of the units or circuits that feed the stage horns or else right in the horn system itself. If it is a two-way system, and the sound is very guttural, perhaps the high frequency coil has opened. In that case, the projectionist operates the emergency switch or connects the emergency jumpers that should be ready for just such an event.

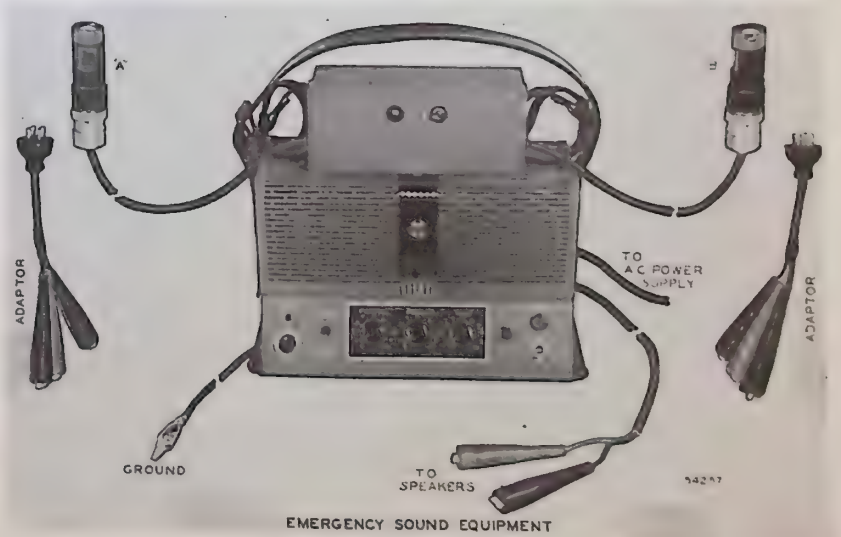
Supposing, however, a common amplifier does not power both the monitor and stage loudspeakers. If it is one of the later sound systems, the monitor amplifier is apt to be a high gain job with enough power to take the place of the entire main amplifier system. In normal operation, its input is bridged across the input of the main power amplifier. In other words, the voltage amplifier drives both the power amplifier and monitor amplifier in parallel. In the cast in question, the tubes and circuits in the main amplifier must be added to the suspect list. How does the projectionist find out whether it is the amplifier or the speaker? Merely by operating the emergency switches that cut the monitor amplifier into service in place of the main amplifier. If the trouble disappears, the main power amplifier must be the culprit. If the emergency amplifier is a portable one instead of a built-in unit, the substitution procedure usually will take a little longer.

If there is no emergency system, the projectionist must know whether he can by-pass the main power amplifier. Some voltage amplifiers deliver several watts output, enough to drive the stage horns in an emergency. The projectionist must know how to feed this limited amount of power around the power amplifier to the stage horns without wasting any of it.

There are several makes of sound equipment in common use. Moreover, each make has a number of models. As a result, the number of possible combinations is almost infinite. To discuss each would take a good sized book. Yet, all of the procedures could be summed up in the end by stating that each is nothing more than a systematic, sensible check backed by a thorough knowledge of the equipment.

To make final corrections and adjustments, and for exacting maintenance, the services of the service specialist are invaluable. The servicer is equipped with the finest tools, test films, and test apparatus that money and skillful engineering can supply. He has a special film which together with an accurate output meter enable him to make exacting adjustments of the optical system. He has accurately recorded and calibrated test films for making frequency response and power handling tests. Each film and each track is designed to give the data wanted quickly and accurately. With these, there is no need to guess as to whether the curve meets Academy specifications at every

THE PORTABLE EMERGENCY SOUND SYSTEM consist of an amplifier, phototube equalizing network, sound changeover switch, and an assortment of adaptor cables. Phototubes plug into adaptors A and B which, in turn, are inserted into soundhead phototube housings. The system, accordingly, by-passes everything between film and stage loudspeakers, enabling the servicer to get to the trouble quickly.



EMERGENCY SOUND EQUIPMENT

point. He has available the special films and test equipment needed for noise and flutter tests. He has the equipment and know-how for properly phasing and poling the stage loudspeakers so that their outputs blend smoothly into each other.

The servicer has a special Triatic signal tracer. This unique instrument, acclaimed by service experts as one of the most valuable developments in the test equipment field since the beginning of sound pictures, enables him to test the system's performance at virtually any point. With it he can quickly locate the source of sound trouble, hum, and so forth. He can test for changes in capacity and variations in voltage. The results are reflected by a miniature television mirror screen. Moreover, he can perform these operations while the system is in regular operation. By coupling the Triatic's built-in high gain amplifier direct to the photo-tube in one soundhead, he can proceed to test and align its optical system by running a frequency film while the other projector is going ahead with the regular performance.

Still another instrument, the Volt-Ohmyst, provides accurate metering of voltages and circuit resistances.

Besides these special test aids, the servicer is equipped with special tools. And in addition, he carries with him a portable emergency amplifier equipped with cables and adapters for connecting it in lieu of the regular theatre system. A variable frequency compensator adjusts the frequency response characteristics to match that of the system it replaces. With this amplifier handling the show, the servicer can proceed with the repair of the regular system. It has proved particularly valuable in restoring fire-damaged installations to service.

Of course, the mere possession or availability of such equipment is in itself no guarantee that the results will measure up to the cost. The man must know how to use it. And, in addition, he must know how to correlate the various data and interpret them.

Each theatre servicer is carefully selected for his technical ability, experience and general knowledge of theatre sound and projection equipment. He is given specialized instruction on the installation, adjustment, operation, and servicing of all makes and all types of sound equipment—competitive, as well as his own company's. To keep him informed, his home office constantly feeds him information in the form of installation and operating instructions, equipment modification data, and service procedures.

When a difficult problem requires special handling, the servicer gets assistance from his theatre field supervisor. Whenever he wishes, the district service manager may also request assistance from the technical section of the home office. He can go even farther and request an investigation by the electronic acoustical engineering department of his company. The latter, in turn, can bring into the picture the unparalleled facilities of the company's technical and research laboratories.

The effectiveness of the theatre servicer's work is expanded by a replacement parts plan, a feature which is finding favor with both the exhibitor and the projectionist. This is the plan under which for a nominal fixed sum each week or each month, the company furnishes all replacement parts and tubes required by reason of normal wear and tear. The exhibitor likes this plan because he can accurately budget his maintenance costs; the projectionist favors the plan because he knows that his equipment is going to be maintained in first-class condition. The servicer prefers this plan because under it he is free to order any part or tube which he thinks should be replaced without bothering with approving signatures.

The projectionist also can help expand the usefulness which he and his theatre derive from the service plan. He can spot parts which may require replacement. These he can point out to the servicer during routine inspections. He can also describe to him any peculiarities he has noticed in the operation of the equipment since the last inspection. He can also help by maintaining a stock of replacement parts in an orderly condition with everything plainly labeled.

To help the projectionist keep abreast of technical developments, the RCA Service Company can furnish him with helpful information through the medium of such books as the "Photophone Handbook for Projectionists" (of which 30,000 copies have been distributed all over the world) and the "Theatre Television Handbook for Projectionists." Close contact is, of course, maintained with the Academy of Motion Picture Arts and Sciences and the Society of Motion Picture Engineers.

It is possible to operate a theatre without the regular benefits of a good sound service organization. But such an organization is almost indispensable to exhibitors who are striving to make the most out of their investments. This group, numbering a good many thousands, knows that a good trouble-preventive service plan is definitely not a luxury.

THE TRIATIC SIGNAL TRACER enables the servicer to test the sound system's performance at virtually any point. With it he can quickly locate the source of sound trouble, hum, and the like. He can test for changes in capacity and variation in voltage. The results are reflected by a miniature television screen. The tests with the signal tracer can be performed while the sound system is in operation.



New Instruments to Help Theatre Servicers

Special Tools Aid Checks on Sound Systems And Test Reels Make for Better Projection

The perfection of projection and sound in America's theatres is maintained only through the eternal vigilance of the projectionist, the theatre manager, and the serviceman.

Little there is that the theatre manager can do, save to be so familiar with what should be that he is able to detect the deviations in the highest possible standard. The projectionist can do more, yet he is largely restricted to what might be termed the grosser adjustments of the equipment. Thus it is up to the serviceman, whose training, education, and experience have given him the scientific understanding and the technical know-how to keep the projection-booth equipment, and particularly the sound system, at the peak of operating perfection.

That such periodic servicing may be more precise and that the available data can better be interpreted so that proper adjustment can better be made, the research laboratories of manufacturing companies are constantly devising new tools for servicemen. The following sections pertain to some of these recent aids to services of sound and projection equipment.

AUDIO VOLTMETER

The production of a new, highly sensitive vacuum tube audio voltmeter for use in industry, laboratory, and radio servicing, designed to measure a.c. voltages over ranges of frequency and amplitude far beyond the limits of ordinary a.c. voltmeters, has been announced by the Engineering Products Department of the Radio Corporation of America.

The unusual sensitivity of the new audio voltmeter (Type WV-73A) makes it possible to measure the electrical conductivity of switches, circuit breakers, relays, buses and grounds, in addition to transmission losses in lines and circuits and the response of special filters and compensators.

The new instrument is also applicable for testing radio receivers and sound systems and is used to measure gain and noise level in power amplifiers and ripples voltages in power supplies. The meter is also used to locate sources of frequency distortion and faulty amplifier components in receivers, phonographs, and public address systems.

The audio voltmeter includes an input circuit with low capacity and high resistance which makes it particularly suitable for measuring voltages in high-impedance circuits. This makes it possible for the electronic meter to measure the response of audio frequency power amplifiers and loudspeakers without disturbing their frequency characteristics. The range of the meter is 20 cycles to 20 kilocycles.

The main components consist of a precision attenuator, a three-stage high-gain stabilized amplifier, a balanced diode rectifier, a special d.c. microammeter, and a regulated power supply.

The voltage to be measured is fed to the attenuator through a shielded cable attached to a jack on the front panel. The attenuator consists of an eleven position switch connected to non-inductive resistors, arranged in such an order that consecutive switching ranges overlap by 10 decibels. The meter can measure one one-thousandth of a volt, to one thousand volts.

From the attenuator, the voltage is fed to the high-gain amplifier, which employs a conventional feedback circuit to obtain stabilization and sharply reduces the input capacity of the first tube. Output voltages from this amplifier are fed to a balanced diode rectifier in order to produce d.c. for energizing the meter.

The high-level rectifier is designed to produce an output voltage that is proportional to the average value of the full wave, thereby giving a meter reading that agrees very closely with an RMS meter for all usual distorted waveforms. Because a balanced diode rectifier is used, the meter indicates the true value of both halves of the wave, avoiding the polarity or turn-over error of half-wave circuits.

Other applications of the new RCA audio voltmeter include: use as an audio amplifier which gives high gain with essentially perfect fidelity, and whose sensitivity makes it especially adaptable for use with microphones having low output; bridge measurements which readily indicate the null point at either high or low audio frequencies; measurement of the output of a phototube with sensitivity that will indicate extremely slight variations in light intensities to which the tube is exposed; and measurement of currents as low as one one-thousandth of an ampere, or if a 0.1 megohm external resistor can be used, currents as low as 0.0001 milliampere can be measured.

RECTIFYING PROBE

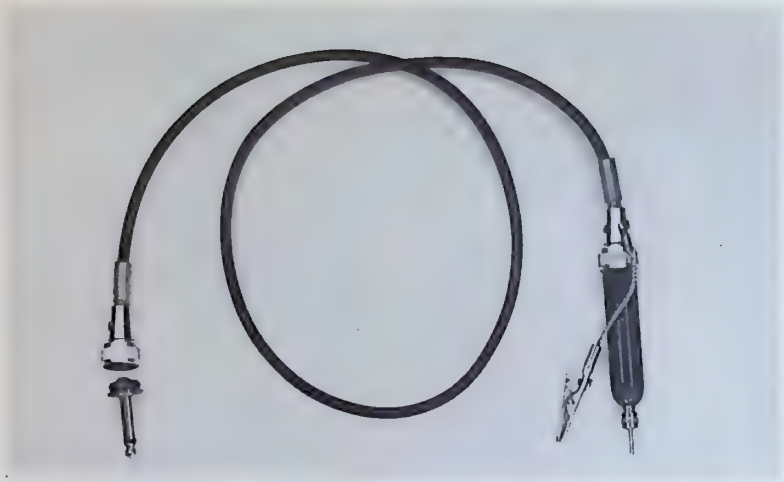
A new miniature crystal rectifying probe, which adapts the VoltOhmyst and Chanalyst for circuit testing of television, frequency-modulation, and other VHF applications within the sensitivity ranges of these instruments was announced by the Test and Measuring Section of the Engineering Products Department of the Radio Corporation of America.

The new probe (Type MI-8263), which may be used with all models of the VoltOhmyst, employs a germanium crystal to rectify applied a.c. voltages which are then measured by the d.c. circuit of the meter. The meter reading is proportional to the positive peak of the applied a.c. voltage. Excellent linearity is obtained with the probe, even at the ends of the meter scale, and, because of its low input capacity and high impedance, this accessory is especially suited for accurate reading without regard to load resistance.

Designed to facilitate testing in difficult places, the probe has a long, narrow point. Its body is constructed of durable insulating material and reinforced at the end with a metal shield to eliminate capacity effects when held for testing. A detachable ground lead with an alligator clip is provided for

THE AUDIO VOLTMETER measures a.c. voltages over ranges of frequencies and amplitude far beyond the limits of ordinary meters of this type. The unusual sensitivity of the new RCA unit makes it possible to measure electrical conductivity of switches, circuit breakers, relays, buses, and grounds, in addition to measuring the transmission losses in lines and circuits and the response of filters and compensators.





THE CRYSTAL RECTIFYING PROBE adapts the RCA VoltOhmyst and Channalyst for circuit testing of television and other VHF applications. It employs a germanium crystal to rectify applied a.c. voltages which are measured by the d.c. circuit of the meter. This versatile probe is equipped with an alligator-clip around lead and a special connector and detachable phone plug for use with the VoltOhmyst.

use at the highest frequencies, where the lead length becomes an important factor in over-all accuracy.

The probe cable is equipped with a special VoltOhmyst connector and detachable phone-plug. The plug is provided for use with older models of the VoltOhmyst and Chanalyst. When the probe is used with later models, the phone-plug is unscrewed and the cable can be attached to the meter by means of the special connector.

BATTERY VOLTOHMYST

The RCA battery VoltOhmyst (Type WV-65A) is a self-contained, lightweight vacuum-tube voltmeter which operates independently of any external power source. This means that the meter can be used for servicing equipment in automobiles, airplanes, boats, in rural areas, in industrial electronic applications or other places lacking conventional power outlets. Incorporating the best features of the conventional model VoltOhmyst, the WV-65A now in production measures 9⅝ inches high, 6¾ inches wide and 6¾ inches deep. It has five a.c. and six d.c. voltage ranges measuring up to 1000 volts; six ohmmeter ranges measuring up to 1000 megohms; and six ammeter ranges which measure up to 10 amperes.

Used with the newly announced crystal probe (MI-8263), the battery VoltOhmyst is capable of testing voltages up to 100 megacycles.

A neon pilot light mounted in the front panel flashes on and off whenever the selector switch is in either the "+ voltage," "– voltage" or "ohms" position, indicating that the instrument is in operation.

OPTI-FOCUSSER

The Opti-Focusser is a completely self-contained amplifier (no external power connections are necessary) which was designed for the sole purpose of quickly aligning any motion picture sound optical system, according to the S.O.S. Cinema Supply Corporation.

Constant vibration of the entire projector including the soundhead invariably will result in the sound optical tube, holder or associated components moving slightly out of alignment and thereby throwing the sound optical system out of perfect focus. The removal for cleaning or replacement of any soundhead component will also invariably disturb the optical system focus. In the case of the smaller, portable systems, especially 16-mm. equipment, frequent handling, jarring and even dropping will all too often result in optical system misalignment.

Lateral misalignment of the film sound track due usually to wear of the shaft ends of rollers, guides and sprockets also will cause sound distortion, frequency discrimination and noise.

These conditions may be accurately (within 3 db.) compensated for by the novice or the expert in a few seconds on practically any 16-mm. or 35-mm. soundhead by the use and application of the above mentioned Opti-Focusser.

A pair of alligator clip leads supplied with the Opti-Focusser are used to make immediate connections to any photo-cell circuit without removing or disturbing any existing wiring merely by clipping them directly to the terminals of the photo-cell socket. Connection may also be made at the end of the photo-cell cable to the prongs or terminals of the connecting plug, or directly to the control grid terminal of the first stage tube in the amplifier.

No connections other than these two simple clip leads are necessary in order to make the required adjustments. A loop of test sound track supplied with the Opti-Focusser is threaded and run through the soundhead during the adjustment period. The operator, using the earphones provided, listens for the loudest and best quality tone while making the necessary adjustments and alignment of the soundhead components. It's just as simple as that.

The theatre amplifier is not used during the alignment, all necessary power and adjustable PEC voltage being supplied by the Opti-Focusser.

The Opti-Focusser is entirely self-contained except for an external pair of earphones.

While the adjustment is being made, both hands and both eyes of the operator are free to make the alignment. No meters or other visual indicators are used which would distract the eyes or attention of the operator away from the soundhead. All outside voices or distractions are most effectively eliminated by the use of the earphones.

The operation is so simplified that quick and accurate aligment can be made with perfect ease between reels and while the other projector is running.

No additional equipment or accessories are required.

TEST REELS

When installing new projectors and screens or performing maintenance operations on existing equipment, servicemen and projectionists have been forced to work without adequate test standards for checking picture head performance. As a result, adjusting the position of two projector heads so that both pictures exactly fill the screen and properly masking the picture being projected were extremely laborious and time consuming. This new type of test film, developed as a service to exhibitors and others, will make checking more efficient and quicker.

The Society of Motion Picture Engineers and the Research Council of the Academy of Motion Picture Arts and Sciences have developed a new 35-mm. visual test film to be used by theatre projectionists, service companies and theatre equipment distributors for checking the performance of 35-mm. picture heads.

The SMPE Film Projection Practice Committee, under the chairmanship of G. T. Lorance, designed a new series of test targets to provide a convenient check of focus and picture alignment, travel ghost, jump and weave and lens aberrations.

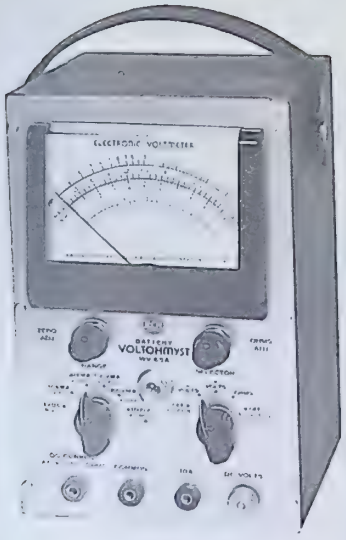
The film is silent and is made up of four separate target sections: The focus and alignment target, shows whether or not picture size and screen masking are correct, and whether the projected picture is centered properly on the screen.

The travel ghost target shows improper timing of the shutter quite readily and gives an easy indication of the correct adjustment as the timing is being corrected.

The jump and weave target gives an accurate indication of the unsteadiness of the projected picture. Picture jump is measured in per cent of picture height, and picture weave is measured in per cent of picture width.

The lens aberration target shows picture distortion and gives an indication of the lack of sharpness that will be present in pictures shown on any particular projector.

The 35-mm. visual test film is 415 feet in length, printed on safety film, and is available from the Society of Motion Picture Engineers and the Research Council of the Academy of Motion Picture Arts and Sciences. It is also available for export with an additional charge for shipping. Some users prefer to use separate loops or continuous lengths of the different target sections



THE BATTERY VOLTOHMYST is a vacuum-tube voltmeter which operates without dependence on any external power source. This makes the RCA meter ideal in servicing where there is no power.

for adjusting one or two machines, and therefore separate sections of the first three targets have also been made available.

A new Altec theatre test film to be known as ED-35 transmission and test film has been developed by Altec with the aid of the Research Council of the Academy of Motion Picture Arts and Sciences. This new test film will be of laboratory precision and will be printed on safety stock and made up of a wide variety of constant frequency, buzz track and flutter test sections.

The Altec engineering group, back in the old ERPI days, developed the first calibrated multi-frequency test film for theatre servicing more than 12 years ago. This was the first big advance in the science of theatre servicing. It marked the beginning of an era where sound in motion picture theatres was to be considered from a technological standpoint rather than merely a means of making "talking pictures" just "talk." Theatre service engineers were given a tool to actually measure the sound delivered to the audiences on a scientific rather than guesswork basis.

For years the only satisfactory method of producing high grade test film required the costly process of toe recording, which meant that every foot of film had to pass through the recorder. Printing methods would not produce a test film of a uniformly high degree of quality. After years of research and development on the part of Altec's New York engineering department, Altec's Hollywood laboratories and the Research Council, methods were developed for producing calibrated test film of steady uniformity high quality through the controlled use of the printing process.

SWEEP FREQUENCY FILM

The Clarkstan Corporation's sweep frequency film, a Wayne R. Johnson development, provides a new method for making instantaneous qualitative and quaititative analyses of the performance of the entire studio recording systems, theatre sound reproduction systems and their individual components, such as microphones, transmission lines, power amplifiers, pre-amplifiers, light valves, and monitoring systems.

Before the developments of the sweep frequency film, frequency response measurements were made with the single frequency tone film. This method is both time-consuming and laborious. When adjustments were required on the equipment, a new frequency run was required after each adjustment. Now, all that is needed is a cathode-ray oscilloscope and the sweep frequency film for the instantaneous measurement of frequency response.

The sweep frequency signal is recorded on a high quality variable density recording head (single 0.200 inch). The repetition rate is sufficiently high to avoid objectionable flicker results. The reasonate frequency of the recording head armature used is 11,000 cycles. This is well beyond the highest frequency recorded. No equalizer has been employed to compensate for slit losses of the playback heads or for processing losses.

If the sweep frequency film is used as a secondary frequency standard, equalization can be employed to provide a flat output. This equalization will vary with the slit width of the playback head.

The sweep frequency film is normally supplied in short lengths so that a continuous loop can be made, thereby eliminating rewinding.

For instantaneous and complete production testing of reproducers, filter networks, audio amplifiers, pre-amplifiers, transformers, attenuators, tone control systems, and the like, each component may be quickly and thoroughly tested for all its over-all performance.

Harmonic distortion may be observed as a bright line, usually running irregularly through the middle of the pattern. The phase may change with the frequency and amplitude, this will cause the line to go either up or down if there is a phase shift. Critical observation can be made with an expanded sweep. The distortion frequency may be computed by observing the nearest marker pulse. This provides a qualitative analysis of the distortion generated by the playback system.

The sweep frequency is not limited to frequency response measurements. It may be used to observe a number of important parameters. Being logarithmic, the higher frequencies are swept at a faster rate. This shows the transient response performance of the playback system at the higher frequencies.

By using an expanded sweep of the oscilloscope, clear detail is obtained.

With high quality playback systems, the pattern will approximate the pattern which is obtained from the monitor oscilloscope of a primary standard sweep frequency generator. The playback system will become a secondary standard sweep frequency generator sufficiently accurate for most laboratory measurements.

Many playback systems use sharp cutoff filters to remove the higher frequencies because of grain noise and intermodulation. This may be checked for transient response by observing the 170 microsecond synchronizing impulse at the start of the sweep. The horizontal gain control of the oscilloscope may be advanced to produce an expanded sweep, at the same time adjusting the frequency adjustment control to bring the pattern into view. Playback systems adjusted to conform to the sweep frequency pattern will have a superior degree of quality.

THE OPTI-FOCUSSER is a completely self-contained amplifier which was designed for the purpose of quickly aligning any motion-picture sound optical system. No connections other than the two simple clip leads are necessary in order to make the required adjustments. A loop of test sound track, supplied with the Opti-Focusser, is threaded and run through the soundhead during the period of the adjustment.



Altec Service Corporation

its functions and its usefulness to motion picture theatres of the U. S.

Altec Service Corporation is an organization composed of engineers, trained both in electrical and mechanical engineering practice, with particular emphasis on all mechanisms involving the principles and techniques of the vacuum tube.

This organization is nationwide in scope, and serves motion picture theatres in all parts of the country, both in urban and rural areas. Altec services more motion picture theatres in the United States than any other service organization.

ALTEC CONTRACTS

Motion picture theatres receive the services of Altec under several forms of contract. One form comprises regular inspection of sound equipment. A second form calls upon Altec to provide parts for repairs and replacements to sound equipment, for a flat weekly charge. A third form calls upon Altec to provide parts for repairs and replacements to the projection equipment as well as the sound equipment, for a flat weekly charge.

STOCK POINTS

Stock points are located at strategic points throughout the country. Because Altec maintains the largest number of such stock points, containing the largest inventory of spare parts of any comparable organization, Altec is able to provide exhibitors with the most rapid restoration of normal theatre operation when an emergency occurs.

TESTING OF PARTS

Altec maintains an engineering staff in a continuously functioning technical laboratory. This staff makes a continuous study of projection and sound parts, in order to furnish Altec's customers with parts of tested reliability and low cost.

NEW METHODS STUDIED

This engineering staff also makes a continuous study of field service problems, and devises new test equipment to promote faster and better diagnosis of sound systems during regular inspections. New techniques and methods, as soon as they are perfected, are relayed to every member of the Altec field force, and are applied at once in Altec-serviced theatres.

ADVISORY BOARD

The engineering policies of Altec are directed by a technical advisory board whose work is coordinated with the research activities of the Research Council of the Academy of Motion Picture Arts and Sciences and the Society of Motion Picture Engineers, as well as with one of the leading development laboratories in the electronic field, and leading manufacturers of motion picture equipment. The work of this advisory board is also coordinated with the development activities of the technical directors of the major producing companies.

FIELD ORGANIZATION

The Altec field force, the largest of any organization in the field, places an Altec Service inspector within easy reach of all motion picture theatres, no matter where located. Activities of Altec Service Corporation are directed from ten district offices, located in New York, Philadelphia, Boston, Atlanta, Chicago, Cincinnati, Detroit, Dallas, Los Angeles and Seattle as well as branch offices and stock points in Charlotte, N. C.; Little Rock, Ark.; Memphis, Tenn.; Miami, Fla.; New Orleans, La.; Boston, Mass.; Hamden, Conn.; Edwardsville, Ill.; Kansas City, Mo.; Minneapolis, Minn.; St. Louis, Mo.; Pittsburgh, Penn.; Cleveland, Ohio; Houston, Texas; Fresno, Calif.; Phoenix, Ariz.; San Francisco, Calif.; Tucson, Ariz.; Salt Lake City, Utah; Billings, Mont.; Denver, Colo.; Portland, Oregon; Brooklyn, N. Y.; Buffalo, N. Y.; Syracuse, N. Y.; Newark, N. J.; Baltimore, Md.; and Washington, D. C.

Inquiries addressed to the home office, 250 West 57th Street, New York, or to the nearest district office, will bring full details about Altec service without obligation.

ALTEC
SERVICE CORPORATION

250 West 57th Street · New York City 19

CHANGE TO ALTEC SERVICE . . . A CHANGE FOR THE BETTER



...if looks could hurt!

● Bad sound brings on looks like these. They're aimed to hurt you plenty whenever bad sound ruins an otherwise top-notch show.

To make sure your sound has the snap and clearness that pleases every patron, sign up for RCA Service.

Through RCA Service your equipment gets regular checkups by a skilled factory-trained technician. He is backed by the finest test equipment, test films and sound engineering in the business. You get fast service on parts. You get prompt help in an emergency.

Stop worrying that sound troubles may hit you where they really hurt. For the cost of a few admissions a day you can protect yourself against the sound trouble bugaboo.

RCA SERVICE COMPANY, INC.
RADIO CORPORATION of AMERICA
CAMDEN, N. J.

INTERNATIONAL ALLIANCE *of* THEATRICAL STAGE EMPLOYES and MOVING PICTURE MACHINE OPERATORS of the UNITED STATES and CANADA

Affiliated with the American Federation of Labor



RICHARD F. WALSH
International President

WILLIAM P. RAOUL
General Secretary-Treasurer

Suite 803, International Building
630 Fifth Avenue
New York 20, New York

ADVERTISING

1947-48

The Exploitation of Theatre Construction

Ballyhoo of Building Activities Can Beget Considerable Public Interest and Good Will

In the field of the theatre, the activities of advertising, publicity, and exploitation seem most generally praticed in reference to film entertainment. Yet, actually, any activity in and around the theatre may be the source of valuable publicity for the house. When the Miami Theatre was only in the blueprint stage, Wometco Theatres planned a continuing program of propaganda designed to create and develop such public interest and good will that the more than 172,000 persons of the Sunshine State's second city would consider the theatre an old friend, even on the opening day.

First things coming first, three pulchritudinous damsels were photographed placing a sign—"Making Way for Wometco's New Miami Theatre . . . to be erected on this site"—on the fence thrown up around the area. Not only is the announcement of a new theatre news of the man-bites-dog variety in anyone's newspaper, the use of shorts-clad gals resulted in additional space in the papers.



THE FIRST ANNOUNCEMENT of the Miami Theatre is publicized by a typical trio of Florida pulchritude. The sign assures public interest and the girls make the picture worthwhile printing.

SPECIALLY PAINTED SIGNS, with credits to architect, builder, and subcontractors, always add interest to a construction job, answering the public's questions even before they are asked.

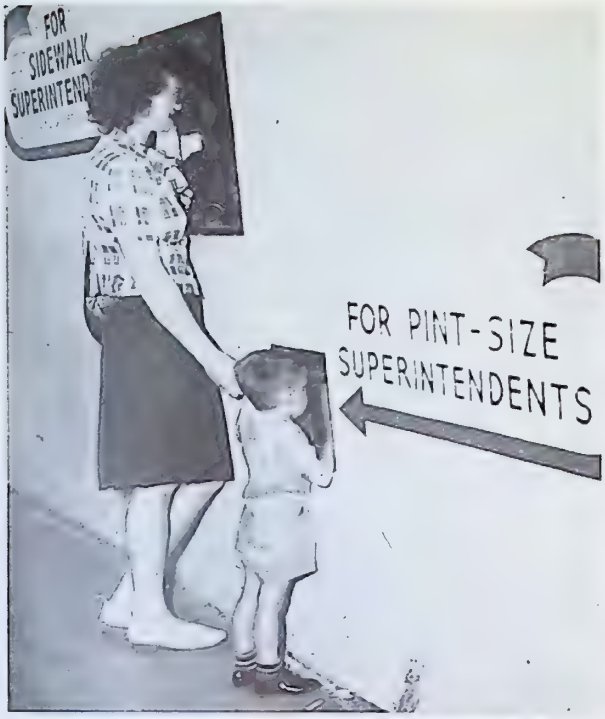


When the project developed to a point where credits to subcontractors along with the architect and builder, could be made, a special sign was painted on the protecting barrier.

The use of observation windows for sidewalk superintendents is nowadays virtually a must-do on construction jobs of any appreciable size. But what is rather new is the installation of a smaller window at a lower level for use of the younger generation, no less full of interest and curiosity than its elders.

While perhaps this sort of continuing ballyhoo is not exactly new or novel, it still remains a high-rating way to create, develop, and maintain public interest and good will. And certainly few theatres have handled the continuing campaign with the flare for showmanship, generally thought of in connection with the American theatre, as did Wometco.

Theatremen everywhere might well consider the possibilities of capitalizing on the public's curiosity to see for itself what is going on behind a high board fence. Such devices as are indicated on these two pages are not expensive, and they promote the double purpose of satisfying a native curiosity and building good will which, if properly furthered after the house is in actual operation, should go far in making the theatre not only an integral part of the community but also in virtually engendering a pride of ownership on the part of the public.



SIDEWALK SUPERINTENDENTS (above) of all ages and sexes take particular pride in the buildings they supervise—and the smart builder immediately takes steps to sate this weakness.



WHAT IS SEEN (above), at least at this stage, is the steel framework of the building proper as well as that which is easily recognized as the balcony. The side walls are stating upward.

A CLOSER VIEW (below) of the balcony steelwork reveals a degree of substantiality that only seems to be of greater dearee than that of the theatre box itself. Concrete work is starting.



Junkets Return as an Exploitation Medium

The Producers Resume Sponsorship of Trips To Ballyhoo Towns, Theatres, and Premieres

G. F. NONAMAKER
Editor of BETTER MANAGEMENT, *and Associate Editor of* THE EXHIBITOR

This year, prior to the instigation of the drastic economy wave that hit the industry when the full weight of the British ad valorem tax was felt and realized, marked the return of the junkets to towns and cities all over the United States for the premieres and tub thumping of many Hollywood productions.

Wartime travel restrictions had been removed and the lid was off as far as criss-crossing the country via rail and air was concerned.

Outstanding, perhaps, was the Warner trip to Skowhegan, Maine, where "Life with Father" had its first showing in the straw-hat theatre first housing the first performance of the famous Clarence Day play, by Howard Lindsay and Russel Crouse. Coming at a time of the year when it was a pleasure to vacation in Maine at Warner's expense, this the critics, and the newspaper and trade paper boys and girls, liked. The play had its world premiere on August 14, 1939, at the Lakewood Playhouse there, with the Warner film having its world premiere on August 14, 1947.

Republic, not to be outdone by the major companies, beat the drums for "Wyoming" with a premiere in Cheyenne, with stars William Elliott and Vera Ralston on hand for the big doings at the Fox Inter-Mountain Paramount and Lincoln that tied in with the 51st annual Frontier Days Celebration. A feature of this bally was a "Know Your Wyoming" contest, set with the Tribune Eagle, with contestants asked to identify photographs of scenes in Wyoming. First prize was a two-week, all-expense vacation auto trip throughout the state. Following the premiere the film played 83 day-and-date engagements in the Rocky Mountain area.

Eagle-Lion got on the bandwagon with a junket to Zanesville, Ohio, where "Repeat Performance" bowed in at the Liberty, Weller, and Quimby, and where the state of Ohio rolled out the red carpet for Richard Basehart, one of the stars of the film, in one of the greatest welcome-home celebrations seen there since the First Regiment of Ohio volunteers came back from the Civil War. Originally scheduled for only the Liberty, the state-wide interest aroused by the advance campaign set by Eagle-Lion director of advertising, publicity, and exploitation, Max E. Youngstein, and staff, forced the addition of the other two houses to handle the demand for seats. The New York press and trade-press boys and girls were taken out to the little Ohio town for the doings, which also had on hand Chili Williams, Frances Rafferty, Benny Rubin, producer Bryan Foy, and others.

For "Trail Street," RKO Radio went to Liberal, Kansas, for its premiere, where bally centered around the dedication of a thoroughfare as "Trail Street." Traveling on a "Trail Street" special train, Bill Williams, Madge Meredith, Billy House, Nan Leslie, and Ray Whitley, among other stars, toured the state, stopping off for bally in Kansas City, Dodge City, Larned, and Hutchinson.

Salt Lake City, Utah, was the scene for the premiere of Enterprise's "Ramrod," UA release which was designated as the official picture of the Utah Centennial at its opening at the Utah. Producer Harry Sherman, stars Joel McCrea, Veronica Lake, Donald Crisp, Don DeFore, Preston Foster, Sonny Tufts, and many others made the jaunt from Hollywood. For this premiere the Union Pacific made available the first post-war special train for such a purpose.

MGM even held a junket for "It Happened in Brooklyn," taking the New York critics to Brooklyn for the premiere of this film at Loew's Metropolitan.

For no apparent reason, Eagle Lion held the twin world premiere of "Bedelia" in Reading and Harrisburg, Pennsylvania; and again the critics and the boys and girls of the press, trade press, and others packed their bags and were off to take part in the doings. Once again they were royally treated by the film company who hoped for some kind words in return. On hand, also, was Isidore Goldsmith, producer of the film.

This enterprising newcomer among the film companies put on still another junket for its Senator Claghorn film, "It's a Joke, Son," featuring Kenny Delmar. Held in Austin, Texas, this was followed by a series of Lone Star State openings in key spots of the Interstate Circuit, including the Aztec, San Antonio; Metropolitan, Houston; Majestic, Dallas; and Hollywood, Forth Worth. On hand were producer Bryan Foy; and a group of stars including Una Merkel, Guy Kibbee, Sheila Ryan, Lois Andrews, Steve Brodie, Jane Darwell, Benny Rubin, and others who helped launch the film at the Paramount and the State. The famous Mexican Government Band of 85 pieces, which had come to participate in the inaugural of Governor

BY TRAIN the junketeers proceeded to the "Life with Father" rendezvous at Skowhegan, Maine, where the Warner Brothers had decided to stage the world premiere of the picture based on the famous Lindsay-Crouse play. Here is the eastern delegation leaving Grand Central Terminal in New York.



BY AIRPLANE they went to Skowhegan, too, to participate in the event that was to duplicate, in the usual spectacular Hollywood manner, an evening exactly eight years before: when, in the Lakewood Playhouse, "Life with Father" bowed to the world that soon adopted the Day family.





ADVANCE BALLYHOO, in the grand manner, helped to prepare the populace for the events that were to descend upon the area. Coming at a time when wartime travel restrictions were but a memory and, too, at a time of the year when it was a pleasure to vacation in Maine at the expense of the brothers Warner, the journey was a joy to Hollywood representatives, as well as to the ladies and gentlemen of the trade and lay press, an entourage always ready to go the whole hog—or in this case would it be more fitting to say pachyderm?—in dishing out the encomiums.

Jester, joined in the premiere festivities, while the Army tied into the celebration by furnishing Klieg lights and searchlights from the Army Air Field, together with an array of rotating searchlights brought from Dallas.

Continuing the junkets, Eagle Lion also put on a simultaneous gala premiere for "Red Stallion" at the Carthay Circle, right in Hollywood's back yard, and also in Dallas. For the latter event stars again took to the rails and helped launch the film at the Majestic.

Other 'round-the-country premieres have also been held; and, despite present conditions, are still being held. A recent one was Paramount's big doings in Pittsburgh, Pennsylvania, site of many of the locations seen in Cecil B. DeMille's "Unconquered." For this event, which took place at Loew's Penn, another bevy of stars and the producer were royally entertained in the Smoky City and the film got off in a whirlwind of high-pressures bally which, of course, entailed yet another cross-country jaunt.

In this, the most ballyhooed business in the world, evidently the "world premiere" junkets on whatever scant excuse or premise possible for tie-ins are here to stay. Despite the expense involved, the resultant publicity and hullabaloo for the product evidently pays off handsomely, or else the various companies would not have been so quick to take advantage of the availability of transportation facilities that make this type of high pressure exploitation possible.

THE TOWN TURNED OUT en masse to greet the travelers who would promote Skowhegan and the Lakewood Playhouse just about as much—on this occasion, at least—as they would "Life with Father." Before the celerities were driven away, they were brought to a platform for their greetings.



EN ROUTE to Skowhegan the junketeers, anticipating the showing of "Life with Father," enjoyed themselves on the seven-car train. The dining car, redecorated to simulate the atmosphere of the straw-hat theatre where the play had made its formal bow, was the continual center of attraction.







FOR "RED STALLION," Eagle-Lion Films, Inc., took its junketeers to Dallas for the world premiere at the Majestic Theatre. Above is the aggregation of Hollywood celebrities brought for the occasion, as they posed on the arrival of their special Braniff International Airways plane.

WHEN THE PICTURE opened simultaneously at the Carthay Circle Theatre in Los Angeles, Jimmy (left), the raven, was an important personage among the celebrities present. However, glamorous the Hollywood opening, the one in Texas stole the show due to rareness of such events.

FOR THE YOUNGER GENERATION, Daisy (right), the dog, was put through her paces at the Carthay Circle branch of the dual world premiere. The picture itself, the story of the affection of a boy for a horse, also has a lot of action appeal for the youth of every part of the country.

STELLAR ENTERTAINMENT was furnished the people of Dallas (below), from a platform—wired for pickups by WRR, the Mutual outlet—erected in front of the Majestic Theatre. Besides being a banner night for the theatre, the local photographers, amateur and professional, had a field day.





Pictures and Bally, the World-Wide Combo!

American Ideas in Exploitation of Pictures Set a Pattern Despite Country and Language

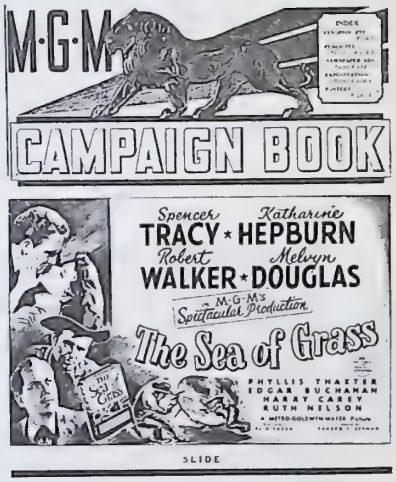
That the selling of American-made motion pictures, from the advertising and publicity angle, is now on a world-wide scale is a foregone conclusion, the visual proof of which is readily discernible from the illustrations on these pages.

The pattern so familiar to all Americans in the merchandising of films is followed pretty closely in all corners of the world, with the motion-picture exploiters evidently just as much on their toes to make the public movie-conscious in France, Spain, The Netherlands, Denmark, China, England—anywhere on the globe, in fact — as they are in these United States.

All the familiar angles are illustrated in these pictures (provided by the producers' films indicated): theatre fronts, window displays, street ballyhoo, billboards, and all the rest.

PRESSBOOKS, easily recognizable whether printed in English or Spanish, are regularly issued by Loew's, Inc., for its Latin American and other Spanish-speaking clients, as these on "Cupido Contra Andy Hardy" ("Love Laughs at Andy Hardy") and "La Dama en el Lago" ("Lady in the Lake"). For Australia, special pressbooks are issued, such as this for "The Sea of Grass." Such pressbooks are written for peoples served.

It becomes apparent that, to attract an audience, one must apply the same principles of salesmanship and tub-thumping regardless of where the potential audience may be. It is also apparent that the tried - and - true — and proved—stunts are usually the most effective.



Doubtless, wherever a cinema or theatre may be, some sort of advertising-exploitation-publicity will be employed to attract an audience. And that the standard for doing just that have come to resemble the familiar ballyhoo used in the United States is tribute indeed to the creative sales genius employed in the industry and loosed in the world-wide selling of the entertainment product that the motion picture is.

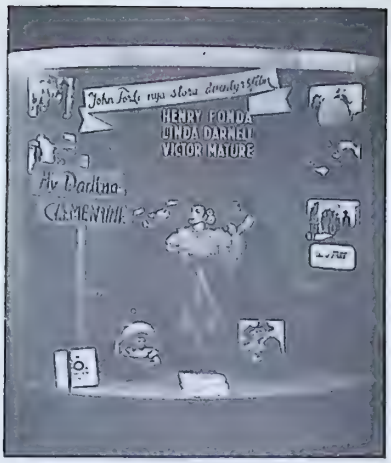
This, of course, becomes readily understandable when one realizes that the product of these same brains, well trained in the field, are utilized on a world-wide basis through the international departments of the various American film-producing companies.

EXPLOITATION throughout the world begins, as it so frequently does in the United States, with the pressbook. While all companies have not prepared material for all countries of the post-war world, the company responsible for probably the most colossal domestic pressbooks ever issued—Loew's, Inc., for Metro-Goldwyn-Mayer pictures—has launched its new schedule by issuing foreign pressbooks in English and Spanish.

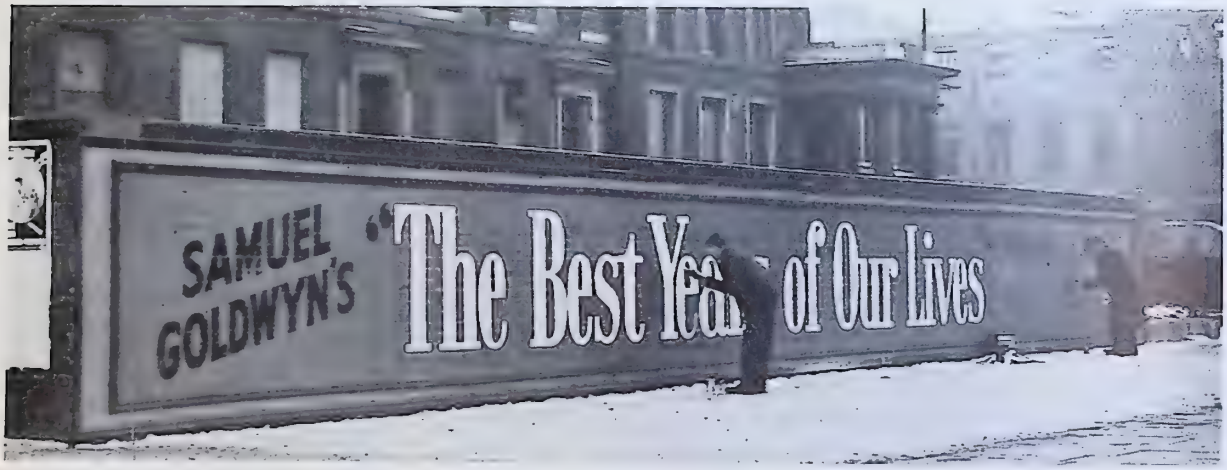








WINDOW DISPLAYS are another major source of ballyhoo for motion pictures, even in foreign countries. Here are two displays arranged by the management of the Park Theatre, Stockholm, for the run of 20th Century-Fox's "My Darling Clementine." Two tie-ups are suggested in these pictures: one is an all-out publicity display for the picture, with no particularly obvious angles, while the other is a display of the cooperative tie-up type, where the store (Meeths) makes fetching use of a blown-up star still not only to advertise the picture but to call attention to its hosiery line.



LARGE, SPECIALLY PAINTED SIGNS are used where the probable length of a picture's run will warrant the expenditure. Here is being painted a sign on a London display wall for the run at the Leicester Square Theatre of Samuel Goldwyn's RKO Radio release, "The Best Years of Our Lives." The 24-sheet is also utilized in many countries for advertising motion-picture productions, with the regular sheets being over-printed with special catch lines, where, perhaps, the English of the original poster might not be wholly comprehended by as many people as would have been desired.

LOBBY DISPLAYS are not infrequent, such as this one at the Churchill Theatre in Brussels, created for the showing of Walt Disney's RKO Radio release, "Fantasia." Even the panel over the doors has been specially prepared for the occasion. While a giant Mickey Mouse (as the hero in Paul Dukas's "The Sorcerer's Apprentice") dominates the scene, other characters from the fanciful musical are featured.



PRIZES are used. As the lucky patron at Oslo's Centrum Theatre for Walt Disney's RKO Radio release, "Pinocchio," the lad received a Pinocchio doll and a half-pound of scarce real coffee.

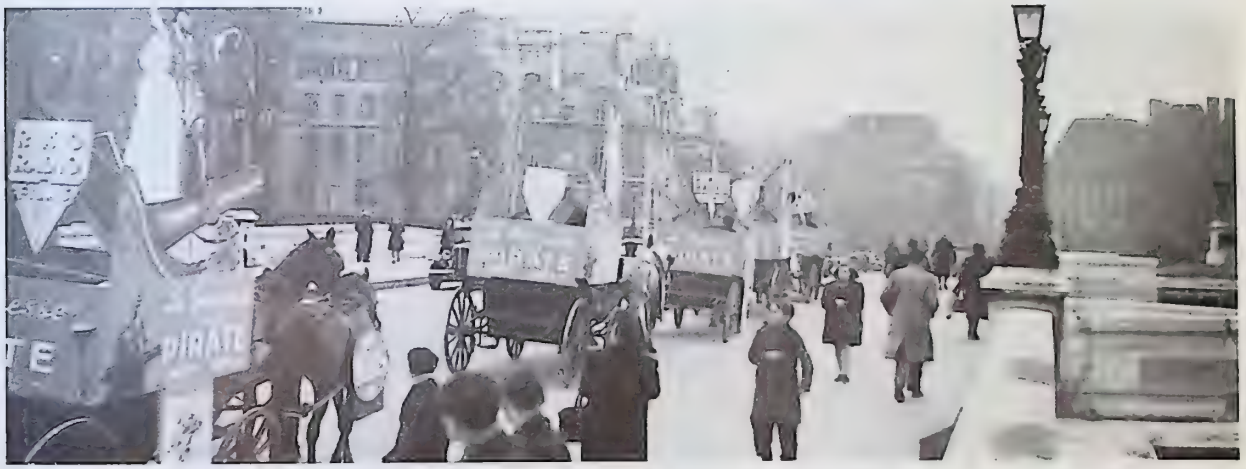




SPECIAL FRONTS are also used frequently to augment the appeal of American motion pictures. At the Gran Via Theatre in Madrid such a front was constructed for the run of Walt Disney's RKO Radio relase, "Los Tres Caballeros." Picture shows a rainy day in the run's third week!



EVEN WITHOUT SPECTACULARS the public lines up for American pictures, as it does here, at the Capitol Theatre in Manila for a showing of the RKO Radio production shown in the United States under the title of "Tarzan Triumphs." Effects of the war can still be seen on some of the buildings.



STREET BALLYHOO is utilized in Paris to create interest in the RKO Radio relase, "La Princess et le Pirate," for its simultaneous run at the Paris Theatre and the Cameo Theatre. The decorated carriages are seen here as they cross the Henry VI Bridge. While there is no mistaking the picture, a feature of the parade that is not too usual is the prominence of the display given the name of the producer. Perhaps Parisians are more conscious of a motion picture's producer than their fellow cinemaddicts in other countries, not even omitting the United States.

A 24-SHEET is affixed to the front of the Golden Gate Theatre in Shanghai as part of exploitation for the dual run of Samuel Goldwyn's RKO Radio release, "The Kid from Brooklyn," here and at the Metropol Theatre. The crowds were a daily occurrence throughout the picture's three-week run.



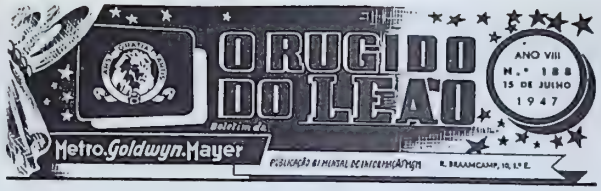
THEATRE FRONT SPECIALS, such as this blow-up cut-out for "Het Teeken van Zorro" (The Mark of Zorro) at the Cineac Damrack in Amsterdam, is used in many places. The reception given this 20th Century-Fox production is typical of the enthusiasm in Holland over the return of American films.







THE LION'S ROAR, probably the finest example of producer-distributor publishing, is by no means restricted to the United States. While it is not in foreign countries the imposing publication it is in the United States, it is, nevertheless, a universally welcomed summary report on Metro-Goldwyn-Mayer pictures which are being or are about to be shown in the particular country. The publication appears in a variety of languages, four of which are shown on this page. As published in Bombay, India, the Lion's Roar (upper left), as might have been supposed, is in English



EM PLENO VERÃO

a Metro-*Goldwyn*-Mayer

REGISTA MAIS

DOIS GRANDES ÊXITOS!

(E TODA A GENTE DISSE QUE OS FILMES ERAM MAL EMPREGADOS NO VERÃO!!!)

ALMA FORTE

OPINIÕES DA CRÍTICA:

«Eis um grande filme...»

«. .Um filme que muitos não esperariam ver, já agora, nesta final de época .»
(Diário de Lisboa)

«Eis um belo filme, inteiramente digno de ficar entre os mais expressivos êxitos da temporada...»
(Diário de Notícias)

« .Um espectáculo empolgante. .» — *(O Século)*

«...Um espectáculo cheio de interesse, rico de pormenores, com valor artístico. O desempenho é excelente. .» — *(República)*

«...Esta película pode considerar-se notável pela classe de argumento e de realização, pela sequência perfeita e pelo seu poder emocional...»
(Diário Popular)

O BOM LADRÃO

OPINIÕES DA CRÍTICA:

«Outro bom filme que não esperávamos ver nesta altura, com um actor de tanta categoria como William Powell, acompanhado por duas belas mulheres e actrizes, Esther Williams e Angela Lansbury » — *(Diário de Lisboa)*

«Um filme excelente » — *(Diário Popular)*

« Este espectáculo desacredita sensivelmente a descrença que, em geral, afecta a programação dos cinemas, por este desbar de estio...»
(Diário de Notícias)

«. .Momentos de excelente comédia» - *(República)*

«. .A reaparição do espléndido actor William Powell, de braço dado com as formosas vedetas Esther Williams e Angela Lansbury ..» — *(O Século)*

and setting forth in this case the merits of "Undercurrent." For Leo's clients in Lisbon, Portugal, O Rugido do Leao (upper right), in this issue tells principally about" Alma Forte" (The Green Years) and "O Bom Ladrao" (The Hoodlum Saint). Nor does unfamiliar typography stop the distribution of "ars gratia artis," and so in Athens, Greece, is published E Phone tou Leontos (lower left) describing in the words the Greeks have for it the production "E Arche eto Telos" (The Beginning or the End). And in Rome, Italy, La Voce del Leone (lower right) sets forth the salient cast details of "Sperduti nell' Harem" (Lost in the Harem). But regardless of what actual combinations of letters are used, it is still the same Lion's Roar.









Penetrati nel mistero di un harem vivono una straordinaria avventura insieme a

JOHN CONTE, MARILYN MAXWELL, DOUGLASS DUMBRILLE
e JIMMY DORSEY con la sua Orchestra

SPERDUTI NELL'HAREM

La più gustosa satira del favoloso Oriente per la regia di CHARLES RIESNER

Hints on Preparing Effective Advertising

Some Recent Layouts Show What Can Be Done For More Efficient Use of Newspaper Space







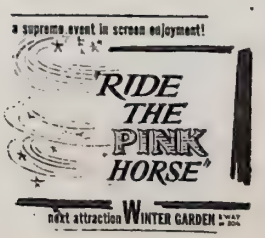
A COMPREHENSIVE IDEA of how advertising and publicity men are best utilizing their newspaper advertising space may be seen in these layouts. It will be noted that in the variety of layouts shown a dignified approach, incorporating critical quotes, a reverse white on black effect bound to attract attention on a crowded page of display advertisements, a layout along more sensational lines utilizing plenty of punchy catch lines, an attractive layout for double features playing simultaneously at two different theatres and combined into one advertisement, a teaser advertisement bound to attract due to plentiful use of white space, and a strip of advertisements good for use by the operator of a group of theatres in the same city which is sure to attract attention due not only to the similarity of the layouts which are off-center, but which make good use of the white left-hand border for institutional messages type-set and well spaced. From this variety of illustrations the average theatre owner should have little trouble in finding help in making his own future layouts. With these as a guide post about all that is needed is a little practice, a pair of scissors, a paste-pot, and the average pressbook. No artists are required in many instances. All that need be done is a revamping of mats available and some punchy catch lines garnered from press books.











Three Ways to SELL SEATS!



1. Every smart exhibitor knows the EYE-and-EAR appeal of TRAILERS . . . that provide a live punch-packed *"sales-talk"*, on your screen . . . to bring patrons *Back* . . . to see your attractions . . . EVERY WEEK . . . to *Bigger* grosses . . . more *Regular* grosses . . .

2. AND . . . of the point-of-contact sales value of The Prize Baby's colorful ACCESSORIES . . . that meet your patrons at your theatre FRONT . . . and in your LOBBY . . . to lure them IN . . . and hit them between the eyes, AGAIN . . . on their way OUT . . . to do a double-duty job of SHOWMANDIZING your pictures . . . where it COUNTS!





3. It's good SHOWMANSHIP to use TRAILERS and ACCESSORIES as your point-of-contact advertising media . . . and to back them up . . . with SPECIAL TRAILERS . . . for ADDED screen exploitation . . . to sell Special Events . . . your Service and Policy!

The PRIZE BABY has 'em ALL . . . in sizes to fit *every box-office requirement!* USE 'EM! *Get back to Showmanship!*

NATIONAL Screen SERVICE
PRIZE BABY OF THE INDUSTRY

BUSINESS PRACTICES

1947-48

A Continuous Inventory for Theatre Use

School's System on Supplies and Equipment Shows One Way to Solve Inventory Problems

FOREWORD

No one however, casual an attendant at the theatre, can fail to appreciate the parallelism in the inventory problems of theatres and schools.

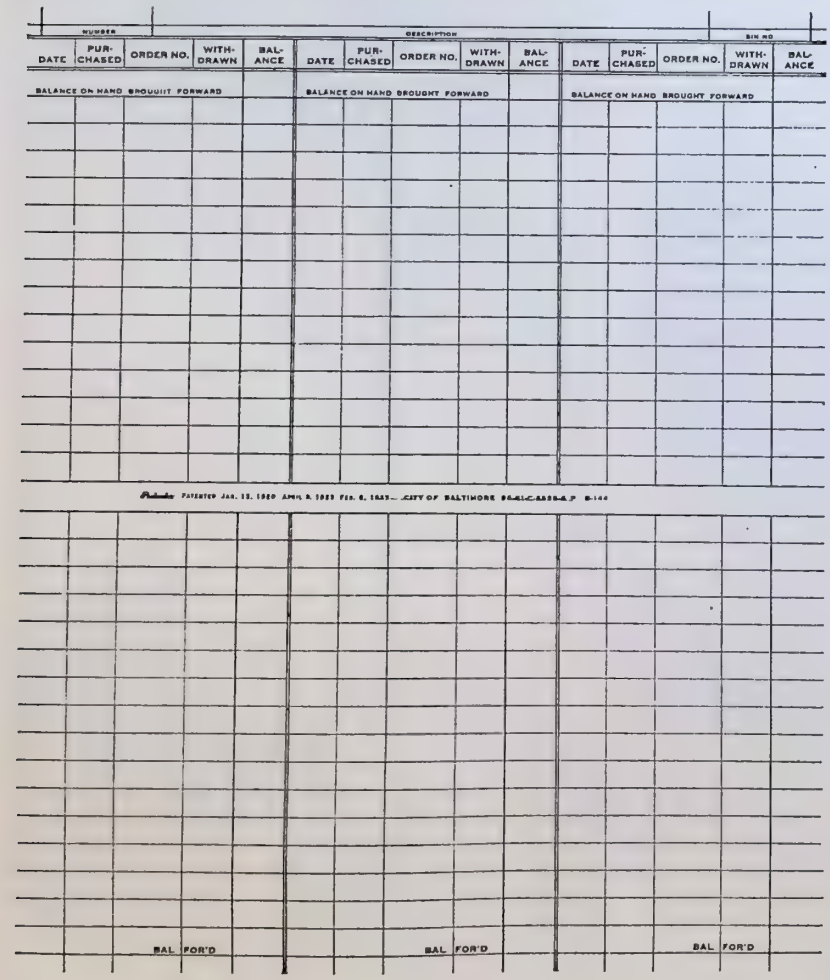
In the American School and University for 1945, the Baltimore schools' system of maintaining a continuous inventory was fully described by George F. Smith, Jr., director of educational supplies and equipment, Department of Education, Baltimore, Maryland. Through the courtesy of that annual's Walter D. Cocking, chairman of the board of editors, permission has been granted to reprint, with slight revisions, that article here.

Because the school and theatre problems are so closely allied, the first four sections of the original article have been adapted to the more particular needs of the theatre. The discussion of the "Principles in Operation" must, of necessity, refer directly to schools, as in the original publication. However, it should not be difficult for the theatre owner or manager to adapt to specific theatre use the school forms presented here in illustration through the courtesy of Mr. Smith.

In its simplest form an inventory is a record of material in the possession of the owner. A continous inventory is one which keeps this record up to date by posting additions and withdrawals at the time they are made and recording the balance.

The complexity of responsibilities of many organizations, requiring that information concerning certain details of their assets be available promptly at all times, has led to the development of the continuous inventory which can be designed to serve many different purposes. The importance to a theatre—and especially to circuits—of having current up-to-date inventory records is recognized by many and considered to be an indispensable part of the operational organization. Supplies and equipment are properties representing cash values which must be accounted for under many different circumstances. They represent enormous investments in a multiplicity of items, and their values, quantities, locations, and characteristics should be available promptly for any emergency that might arise and for efficient and economical operation.

FIGURE 1—The inventory card, 8 by 9¾ inches, shows the stock of educational supplies, new furniture, and equipment on hand in the main warehouse. The card, printed on peach stock, is folded so that the top line—number of the item, description, and bin number—can be easily seen when set in the file drawer. The card is identically printed on both sides. Folded size of this card is 5 inches deep.

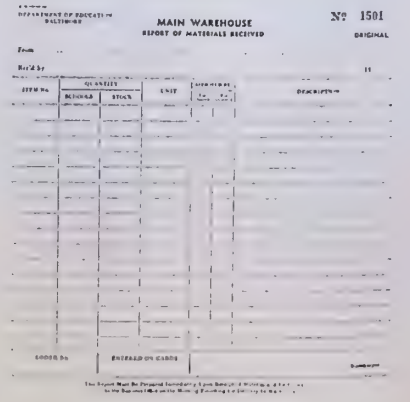


FACTORS AFFECTING PLAN

The uses or purposes to be served by the continuous inventory have been variously stated. Some of the most pertinent are (1) control of school properties for general accounting; (2) guide in purchasing for quantities to be bought in connection with annual needs; (3) avoidance of unnecessary duplication; (4) avoidance of obsolete and slow moving items; (5) guide in replacements; (6) maintenance and repairs of equipment; (7) insurance adjustments in case of fire, theft, or misplacement, and (8) adjustments from other losses or damages.

The nature of the records, forms, and procedures for the continuous inventory of supplies and equipment will be determined by the uses that will be made of it, the general business and accounting set-up of the system, and the type of facilities available. For example, there

FIGURE 2—The main warehouse report of materials received, 8 by 9¾ inches, is prepared in triplicate: original on white, duplicate on yellow, and finally the triplicate printed on blue paper.



DEPARTMENT OF EDUCATION
BALTIMORE

REPAIR SHOP

Nº 1688

REQUEST FOR APPRAISAL

ORIGNAL

_____Warehouse _____ 19 ___

The Following Items Are Being Held For Appraisal

QUANTITY	UNIT	DESCRIPTION	TO BE FILLED IN BY APPRAISER		
			STOCK No.	QUANTITY STOCK	QUANTITY SCRAP

APPRAISED BY _____

DATE _____ ENTERED _____

Storekeeper

FIGURE 3—At the repair shop, the report of materials received is approximately the same as that for the warehouse (Figure 2). The form is 8½ by 8¼ inches, with the original in white, the duplicate on yellow, and the triplicate on blue. Used materials are not reported on this form.

DEPARTMENT OF EDUCATION
BALTIMORE

REPAIR SHOP
MAIN WAREHOUSE

Nº 9676

REPORT OF MATERIAL RECEIVED

ORIGINAL

From _____ 19__

Rec'd by _____ Approved by _____

ITEM No.	STOCK No.	UNIT	QUANTITY	DESCRIPTION

CHECKED TO ORDER ORDER No. POSTED TO CARDS

This Report Must Be Prepared Immediately Upon Receipt of Material and Be Forwarded to the Business Office on the Morning Following Delivery to Warehouse

FIGURE 4—All equipment and supplies returned to the warehouse from schools are segregated, and a request for appraisal is prepared in triplicate, with white paper for the original, yellow for the duplicate, and blue for the triplicate. The dimensions of this form are 8½ by 8½ inches.

is historically a lack of uniformity in the manner in which stock is accounted for. In some systems, all purchases are thrown into stock immediately upon receipt, while in others only a part of the material bought goes into stock, the balance being handled as direct charges to subsidiary units. Some systems operate on the basis of expenditures, others account only for materials disbursed. These differences need not be discussed here, however, because they do not affect the general pattern for continuous inventories.

There are other factors to be considered. Some systems have centralized inventory controls, warehouse storage, and distribution of stock and operate entirely through the central office. Others have an inventory control operating from the central office, with warehouse facilities, but also carry a three or four months' stock at each theatre for use purposes.

It is doubtful, therefore, if any single inventory plan could be developed that might be applied to all organizational systems. Individual differences require adaptations to fit the particular responsibilities, facilities available, and methods of operation. It is thought, however, that certain underlying principles and minimum essentials exist that are common to all inventory plans.

CONTROLLING ACCURACY

Provision should be made to check the accuracy of continuous inventory records by a physical inventory of stock on hand. This inventory may be taken as a continuous check, by which a physical count of a specified number of items is taken weekly, or a similar designated period, so that all items will have been checked with a definitely stated time.

A second control on the accuracy of the various operations of maintaining the continuing inventory, such as prices and extensions, is the book value of the inventory. Maintained by the accounting division, the book value reflects the money value of merchandise on hand for which the continuing inventory should account. It is frequently kept by general classifications. The beginning inventory figure of the inventory account will be debited for all purchases of stock and credited with all withdrawals from stock. At the end of a fiscal period, where a plan of continuing physical check is in effect, or on completion of a physical inventory, the corrected inventory figures will be used as a basis of computing the valuation of the inventory. This valuation is then checked against the book value of inventory. Discrepancies should be handled, under careful supervision, by accounting adjustments.

IDENTIFICATION OF ITEMS

It is necessary that all items be identified. This should be done by an adequate but brief description. An item number is necessary for economical tabulating and ordering purposes.

Explicit information regarding the location of the item is required, that is, warehouse number, theatre, repair shop, bin number, room number.

Each purchasing transaction should be identified either by order number, contract number, invoice number, contractor or vendor, or some other positive means for reference purposes.

Quantities received and disbursed must be recorded and the balance indicated. Old balances must be carried forward.

The date of each transaction must be

FIGURE 5—The deliver-from-stock form is made in quadruplicate: (1) the warehouse copy, (2) the school copy, (3) the certification copy, and (4) the office copy. Three copies are 7½ by 6 inches, while the fourth, because it provides for entering costs and extensions, is 9 inches wide. All sheets are white. The forms are used only for incidental requisitions rather than annual withdrawals.

DEPARTMENT OF EDUCATION
Baltimore

DELIVER FROM STOCK
NO RECEIVING NOTICE NECESSARY

WAREHOUSE COPY 1

Nº 21706

OFFICE COPY 4

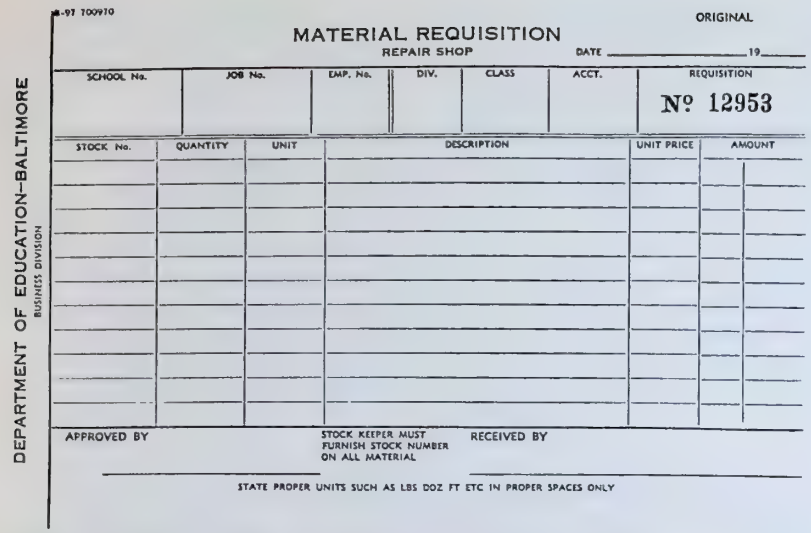
21706

Date _____ Reference _____ School No. _____

STOCK NUMBER OTHER	STOCK NUMBER REGULAR	QUANT.	UNIT	DESCRIPTION	COST	EXTENSION

FILLED BY _____ DATE _____ CHECKED BY _____ RECEIPT NO. _____ APPROVED FOR DELIVERY _____ CHIEF CLERK

EXTENSIONS BY _____



DEPARTMENT OF EDUCATION—BALTIMORE
BUSINESS DIVISION

ORIGINAL

MATERIAL REQUISITION
REPAIR SHOP
DATE _____ 19____

SCHOOL No.	JOB No.	EMP. No.	DIV.	CLASS	ACCT.	REQUISITION
						Nº 12953

STOCK No.	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	AMOUNT

APPROVED BY

STOCK KEEPER MUST FURNISH STOCK NUMBER ON ALL MATERIAL

RECEIVED BY

STATE PROPER UNITS SUCH AS LBS DOZ FT ETC IN PROPER SPACES ONLY

FIGURE 6—A material requisition on the repair shop uses this form, measuring 8½ by 5½ inches. These requisitions are issued and approved by the supervisor of the repair shop. The quadruplicate copies are handled in a similar manner to those issued for the withdrawal of educational supplies from the warehouse, or any materials that are needed for repairs that have been properly authorized.

shown, that is, the date received or the date disbursed.

Units of purchasing—such as "each," "dozen," "pair," "gross," and "pound"—obviously need to be indicated.

Unit prices must also be designated. For purposes of distribution it is frequently found that an average unit price is most convenient.

INVENTORY FORMS

There should be a separate inventory record card or form for each kind of item. This record must provide at least for the foregoing minimum essentials. The design of the inventory is not important, except that it should be large enough for many entries, in order to avoid excessive cards or record forms for the same item. The arrangement of the information on the form should be compact but easily read. The record form should be of a durable quality for frequent handling, of the visible index or similar type for economy of space and flexible and convenient use.

Provision must be made for transmitting to the proper officer or department the transactions that are to be posted to the inventory forms. Forms for this purpose are usually designated as receiving notices and removal notices. They are usually designed to serve several purposes, such as fixing responsibility for the proper receipt of materials and recording of information fixing responsibility for properly filling and checking the orders, certifying that the theatre has received the material and so forth. All other information required for the inventory record except, perhaps, the unit price is, of course, included on these forms. The forms are usually made up in several copies, depending on the uses to be made of them. Each copy is generally labeled to indicate the purpose it serves and its final destination, that is, warehouse copy, theatre copy, office copy, certification, and so forth. The forms should be numbered serially for reference purposes. The various copies of the same form are frequently in different colors as an aid to quick recognition.

FIGURE 7—Reports of material removed from stock are issued by the warehouse showing materials and supplies delivered from stock on annual requisitions or removed from stock on account of breakage, obsolescence, or any reason other than a regular requisition. This form is 8½ by 5½ inches. All such reports must be properly approved before they can become entirely valid in the inventory.

DEPARTMENT OF EDUCATION
BALTIMORE 18, MARYLAND

MAIN WAREHOUSE

Nº 3903

MATERIAL REMOVED FROM STOCK

ORIGINAL

Reason for Removal _____ 19____

ITEM No.	QUANTITY	UNIT	DESCRIPTION

APPROVED _____

ENTERED _____

_____
Storekeeper

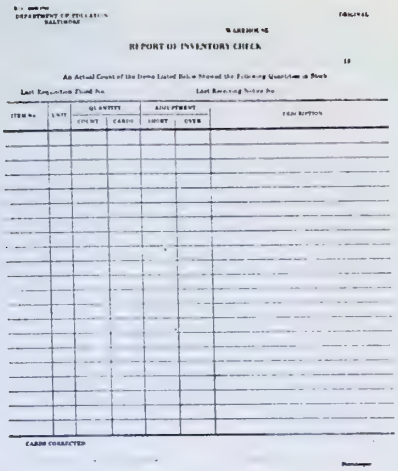
PRINCIPLES IN OPERATION

These principles will be discussed and illustrated in detail as they apply to the operations of a system which has an inventory control operating from the central office and warehouses for stock, with some stock carried in schools for use purposes.

Warehouse and Repair Shop Stock

The inventory cards (Figure 1) showing stock of educational supplies, new furniture, and equipment on hand in the main warehouse—and the cards showing stocks of materials, supplies and equipment on hand in the repair shop—are kept in the central office. On the day that material is received at the warehouse, a "Report of Material Received" (Figure 2) is prepared in triplicate for educational supplies and equipment. A separate set is prepared for materials received from each vendor or other source. The quantity to be placed in stock is shown in the "stock column." The quantity for schools is shown in the "school column." Quantities listed in the school column are not placed in stock but are accounted for by direct charges to schools. The original and duplicate of this report are forwarded to the central office and the triplicate is retained by the warehouse. A report is submitted for all receipts regardless of the source from which the material comes and the purpose for which it is delivered. Any material which is not placed in school bins immediately after being checked in is reported as received for stock, even though it may have been purchased for a particular school. The procedure for materials, supplies, and equipment received in the repair shop is approximately the same as that for warehouse except that a slightly different "Report of Material Received" form is used (Figure 3). Used furniture, equipment brought in from the school for repair and returned to the school, is not reported on this form if a repair order has been issued on it at the time it arrives at the repair shop. Used furniture and equipment that has been covered by a repair order and is being repaired for stock is reported to the central office on the regular form for material received when the order is completed and placed in stock.

All equipment and supplies returned to the warehouse from schools are segregated, and "Request for Appraisal" (Figure 4) is prepared in triplicate. Two copies of this request are sent to the central office, the materials or equipment are inspected by a representative from the central office, and one copy of the form is returned to the warehouse



REPORT OF INVENTORY CHECK

FIGURE 8—The report of inventory check, 8½ by 11 (letter size), is used for incidental requisitions and does not cover materials delivered from the warehouse on usual annual requisitions.

showing the quantities, item numbers, and descriptions of those items which are to be placed in stock, and the quantities and descriptions of the items to be scrapped. A "Report of Material Received" is then issued for the former items.

When the reports of materials received have reached the central office, the quantity shown in the stock column is posted as additions to stock on the inventory cards. Quantities shown in the school column are not posted to the inventory cards as those quantities are placed in school bins for delivery to the schools. One copy of the "Report of Material Received" serves as the official receiving notice and is used by the accounting department for comparison with contracts and audits.

Upon receipt of properly approved requisitions for withdrawal of additional materials from the warehouse, the central office prepares a set of forms, "Deliver from Stock" (Figure 5), authorizing the warehouse to make delivery to the school or other designated place. These forms are prepared in quadruplicate. Copies 1, 2, and 3 are forwarded to the warehouse; copy 4 is held at the central office until copy 3 has been returned by the warehouse; copy 1, the warehouse copy, is retained permanently by the warehouse; copy 2 goes to the school with the delivery of the material and is retained by the school as their copy; copy 3 is the school's certification copy indicating material has been received; copy 4 is the central office copy. Upon receipt of copy 3 from the warehouse, properly certified that the material has been received by the school, it is matched up with copy 4 and the quantity shown as having been withdrawn is posted to the cards. These forms are used only for incidental requisitions and do not cover materials delivered from warehouse stock on annual requisitions. After having been entered on the inventory cards, priced and extended copy 4 is used for accounting purposes.

Reports of "Material Removed from Stock" (Figure 7) are issued by the warehouse showing materials and supplies delivered from stock on annual requisitions or removed from stock on account of breakage, obsolescence, or any reason other than a regular requisition. All such reports must be properly approved by the central office before becoming valid, except, of course, those for stock withdrawn for annual requisitions, for which approval has already been received. The quantities shown on these reports are then posted to the inventory cards as deductions from inventories.

Withdrawals of stock in the repair shop are made on the authority of the central office by means of repair shop orders based on properly approved requisitions. Upon receipt of these repair shop orders, a "Material Requisition" (Figure 6) is issued in quadruplicate for any materials needed for the repairs authorized. These material requisitions are issued and approved by the supervisor of the repair shop. The various copies are handled in a similar manner to those issued for the withdrawal of educational supplies from the warehouse.

On the first working day of each week, a physical count of not less than twenty items of stock is made by the warehouse, and the report of the actual quantities on hand is forwarded to the central office. These items are reported on a form designated "Report of Inventory Check" (Figure 8). When this report has been received at the central office, it is compared with the quantities shown on the inventory cards and, after investigation and approval, corrections and adjustments are made if any discrepancies exist.

In case it becomes necessary in an emergency to deliver any material on a verbal order, a record is made by the warehouse, and the central office is notified by telephone immediately. The central office then, upon proper approval, prepares a written authorization for the delivery on the regular forms, marking them "confirmatory." For convenience in checking and distributing supplies, the warehouse and repair shop maintain in-stock index cards designated as "Bin Cards" (Figure 9).



FIGURE 9—For convenience in the checking and distribution of supplies, the warehouse and repair shop maintain these in-stock bin cards. The cards are printed on stock 5 by 8 inches.

Hand vs. Machine Methods

While hand inventory methods may be the rule in the small school systems, these methods have definite drawbacks and limitations, especially as applied to larger systems. In the first place, there is little check against errors in the unit prices, extensions, and additions, except by a duplication of work. The second disadvantage lies in the fact that it is not customary by hand methods to keep a valuation figure in dollars of the balance on an item card. Such valuations for purposes of comparison with the book value of inventory must be computed at stated periods as required. Hand methods also have disadvantages as to economy of effort in extensions, additions, and posting entries.

FIGURE 10—The typewriter transfer card is a fifth-cut 4-by-6-inch card, with only the first, third, and fifth cuts being used. It is used as a record by serial number and location of all machines in the possession of the school system, as a record of the change in location, and as a cross reference with the typewriter record card (Figure 11). The serial number of the machine is on the tab.

8-141 701410 40

TYPEWRITER TRANSFER CARD

School No. _____ Room No. _____ Desk No. _____

Serial No. _____ Model No. _____ Model No. _____

Type _____ Age _____ Date (of Inventory) _____

DATE AND REQUISITION NUMBER OF TRANSFER TO REPAIR SHOP AND BACK TO SCHOOL

To R. S.	Req. No.	To School	Req. No.	To R. S.	Req. No.	To School	Req. No.

Because of the disadvantages listed above, most of the larger systems adopt machine methods for keeping of inventories. Where the plan is so set up that extensions and additions are handled by such means as tabulation machine equipment the actual posting to inventory records may be done by standard types of bookkeeping equipment. Where problems of extension and addition are concerned, there are great advantages to be had from equipment in the nature of combination typewriter - calculator - accounting machine equipment. Such equipment provides for posting an unextended requisition or withdrawal transaction to the stores ledger or continuous inventory, valuing the "on hand quantity," entering on the requisition the value of the stock disbursed, and proving that the work was done correctly. The record maintained by this machine will give not only the quantity of an item on hand but the total value of that quantity. This method has distinct advantages in greater proof of correct pick-up of unit costs, correct extensions, etc.

TYPEWRITER RECORD CARD

School No._____ Room No._____ Desk No._____

Serial No._____ Model No._____ Make_____

Type_____ (ELITE OR PICA) Age_____ (TO BE FILLED IN BY S. O.) Date [of Inventory]_____

Remarks:_____

DATE	JOB NO.	TIME HOURS	TIME COST	MATERIAL PART NO	MATERIAL COST	TOTAL COST	GRAND TOTAL	DATE	JOB NO.	TIME HOURS	TIME COST	MATERIAL PART NO.	MATERIAL COST	TOTAL COST	GRAND TOTAL

FIGURE 11—The typewriter record card, similar to that shown in Figure 10, but of 5-by-8-inch size. On these cards, the tab carries the school number. Spaces are provided on these forms for recording in detail the cost of repairs and replacement parts for the typewriters. These cards are posted from the copy of completed job order returned to the central office by the typewriter repair shop.

Reducing Number of Postings

In the larger school systems the task of maintaing continuous inventories of stock items becomes almost impossible because of the volume of work, unless some plan is adopted for reducing the number of withdrawal postings. Under some inventory systems, a withdrawal entry on a card is required for each item ordered by each school. In other words, if 150 schools order the same item, 150 entries must be made. Some school systems have developed methods of reducing the number of such withdrawal postings. In general these methods fall into two classes:

1. Where periodic requisitions are received from schools on a quarterly, semi-annual, or annual basis, they are tabulated and the total quantity of each item ascertained. A single withdrawal posting on the inventory card, noted "semi-annual requisitions," will cover the withdrawals of that item for all schools. In other cases, where definite quantity contracts are awarded to fill the requisitions, the amounts requisitioned will be put directly into school bins at the warehouse and charged directly to schools on the basis of distribution sheets, without being thrown into stock and withdrawn from stock. The only entries on the stock card would be (a) additional quantities bought for stock and (b) quantities withdrawn from stock in lieu of purchase, to fill the annual requests. This method has a disadvantage in that the total purchases and usage are not reflected on the inventory card, and a separate "use" card must be maintained.

2. Instead of individual withdrawals for each order or a requisition, the orders for a given period, possibly one month or two months, are tabulated and the total withdrawals of an item for that period handled by one entry; for example, "January orders."

The operation under the foregoing plans (1) and (2) is greatly facilitated by the use of tabulating machines to secure total quantities by items and distribution of costs by schools.

FIGURE 12—Three special forms are used for intra-school inventories. "Inv. 1" is a 4¾-by-8-inch card used for classroom and janitorial equipment and small equipment. It is similar to "Inv. 2" (Figure 13) which is a folded card. In the absence of a central inventory, it is considered highly desirable to have the inventory kept up to date and schools are required to have them available.

ITEM NO. UNIT DESCRIPTION LOCATION

Date	REQUISITIONED How	REQUISITIONED Quantity	Quantity Received	WITHDRAWN How	WITHDRAWN Quantity	BALANCE Unsatisfactory	BALANCE Satisfactory	Date	REQUISITIONED How	REQUISITIONED Quantity	Quantity Received	WITHDRAWN How	WITHDRAWN Quantity	BALANCE Unsatisfactory	BALANCE Satisfactory

Miscellaneous Procedure

In addition to the inventories for supplies and equipment in the warehouse and repair shop, continuous inventories are maintained in the central office for various types of portable equipment located in schools where there is more than a reasonable risk of loss from theft, damage, and misplacement. An additional purpose of this inventory is accounting for maintenance of the equipment.

Some of the types of equipment included in these inventories are typewriters, office practice machines, microscopes, visual educational equipment, sewing machines, and stop watches. The procedure for repairs to this type of equipment is similar to that followed for work done in the repair shop. The job orders are based on approved requisitions from the schools and the detailed information provided for on these inventory records is similar to that provided for on the regular stock inventory records, with the addition of supplemental provisions for data pertaining to the repairs. Cross references are kept by serial number and location of this equipment. The operations for these inventories can be best illustrated by the plan followed for the typewriter repairs. Two types of inventory records cards are used, one designated as the "Typewriter Transfer Card" (Figure 10), the other "Typewriter Record Card" (Figure 11). These are tabbed, one-fifth cut index cards using first, third and fifth positions. Each card has spaces provided for the school, room, desk, and serial numbers; make, kind of type, age, date of inventory. The "Typewriter Transfer Card" is used for several purposes; as a record by serial number and location of all machines in the possession of the school system; as a record of the change in location, that is, either permanent transfers or temporary transfers to the typewriter repair shop for repairs or other purposes; as a cross reference with the "Typewriter Record Card" file. The serial number is indi-



FIGURE 13—The form of card known as "Inv. 2" is similar to "Inv. 1" but is a folded card, measuring, opened up, 8 by 8¼ inches. It is used in schools for keeping inventory on classroom and janitorial supplies and small equipment. Continuous records of perishable supplies and equipment used in classrooms are desirable for certain items because of storage and distribution problems.

cated on the tab. The cards are filed by make of machine in numerical order of serial numbers. When a typewriter is transferred from a school, the posting is done when the transfer has been completed, on the basis of information on the copy of the transfer order returned to the central office. The column headed "To T. R. S." is the typewriter repair shop column. The date of the transfer is posted in this column and the column headed "To School." These cards are retained in the file in the order indicated above; that is, by make and serial number. Cards withdrawn for posting are returned to the file in their original place.

The "Typewriter Record Card" is filed by school number. The school number is indicated in the space provided for "School No." and also on the tab. Spaces are provided on these forms for recording in detail the cost of repairs and replacement parts for the typewriters. These cards are posted from the copy of the typewriter repair shop. These cards move with the machine—that is, if a machine is transferred permanently from one location in the file to the new one and the tab on the card is changed accordingly. This procedure is also followed when typewriters are moved from their permanent location to temporary locations, such as to the repair shop for repairs or to another location for loan, or vice versa. Sections are set up in the file for such temporary changes in location; as an example one section is labeled "Typewriters on Loan" another "Typewriters in Repair Shop." This record serves several interesting purposes. For example, the percentage of typewriters in a system by age can be quickly ascertained. This information is invaluable in considering expenditures for replacement. Adjustments also can be made quickly to meet changes in enrollment. The repair costs also are indicative of the treatment the machine received, that is, if the costs should appear to be excessive, an investigation can be made quickly to determine the cause.

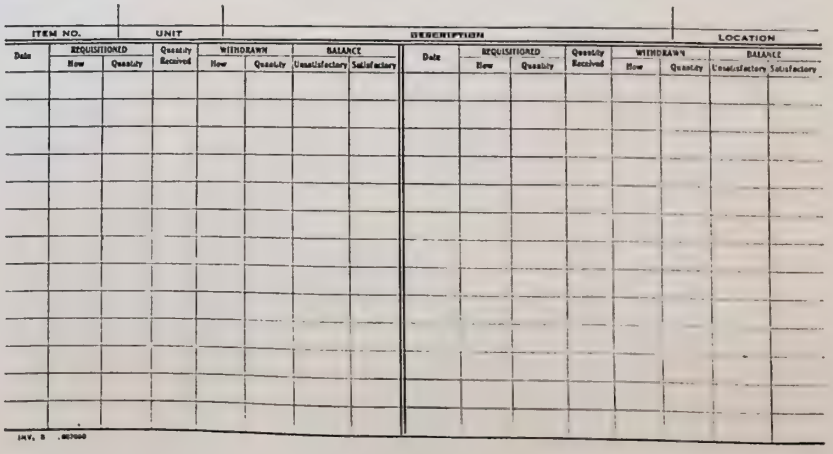
Valuable information with regard to possible vandalism or other misusage or unusually good usage in various schools is revealed. All supporting data pertaining to transactions concerning each typewriter are filed with this card.

Inventories within a School

Continuous inventories within a school are designed to provide current information regarding supplies and equipment permanently assigned to schools or used up within the school term. The items consist of furniture, large equipment (power machinery, for example), general classroom supplies, books, janitorial supplies, etc. Many school systems would not consider it desirable to maintain continuous inventories of furniture and large equipment in the central office since items of this nature could not be easily removed, and the danger of removal or misplacement without authority or misappropriation is negligible. However, requirements for insurance purposes make a centralized inventory of equipment of greater importance in some systems. In the absence of a central inventory, it is considered highly desirable to have the inventory in the school kept up to date in regard to types of equipment, quantity, and locations, and schools are required to have such an inventory available at all times.

Continuous inventory records of perishable supplies and equipment used in classroom, however, are desirable for certain types of items because of the problems of storage and distribution within the school. For example, it is particularly important to have rather exact records of the distribution of books within the school, not only for distribution purposes within the school but for ordering on annual requisitions. For many items, it is perhaps, desirable to take inventory of these items only

FIGURE 14—This 4¼-by-8-inch card is used for keeping the inventory on books and such small equipment as tools, drawing instruments, and the like that are loaned out (usually to classes) and returned at the end of the semester or course. On the card provision is made for recording the quantities requisitioned and withdrawn, and the condition of the balance of the stock in the item.



Size	Description of Motor
Model	Make
Manufacturer	Serial No.
Mfg. No.	Type of Starting
Mfg. Cat No.	R. P. M.
Serial No.	H. P.
	Current
	Phase
	Cycles
	Voltage

INV. 5

FIGURE 15—"Inv. 5" is a 4¾-by-8-inch card, used for furniture and large equipment and provides for information pertaining to motorized equipment. The reverse side of this form is identical with that shown in Figure 14. While provision is made for distribution of items recorded on these forms, in most cases the items are of a type which would not be distributed, so few original entries are made.

INV. 6 REVISED 42

Department of Education – Division of Vocational Education – Baltimore, Maryland

Continuing Inventory of Supplies

Item_____ Shop_____

Kind_____ School No._____ Department _____

DATE	SIZE	ITEM NUMBER	AMOUNT WITHDRAWN	ISSUED TO	BALANCE	DATE	SIZE	ITEM NUMBER	AMOUNT WITHDRAWN	ISSUED TO	BALANCE

FIGURE 16—Separate forms have been provided for all shops under the supervision of the Department of Vocational and Industrial Arts. One of these forms is this "Inv. 6" on continuing inventory of supplies. Physical checks are made by supervisors from the central office of this division once a year, and, frequently, twice a year. Slightly more detail is provided for the special needs.

FIGURE 17—The equipment inventory, "Inv. 7," is another of the forms such as that of Figure 16. The items recorded on these forms are not duplicated on any other stock forms and, even though the items are maintained in the school where the principal is the responsible officer, they are under the supervision of the Vocational and Industrial Arts Division. Physical checks are generally made annually.

INV.-7 REVISED 42

Department of Education – Division of Vocational Education – Baltimore, Maryland

EQUIPMENT INVENTORY

(See other side for power machinery)

Item_____ Shop_____

Mfg._____ School No._____ Dept._____

Date Rec'd	Size	QUANTITY		Model	Mfg. No.	Date or No. Mfg. Cat.	AT CLOSE OF SCHOOL YEAR		
		New	Used				Unfit for use[1]	Lost	Total in good condition[2]

Fill out in ink. Place a check mark in all columns where the information called for cannot be obtained. New or additional equipment recorded when received.

[2] Enter as being received as of opening date of new school year or inventory period.

[1] Hold for return to warehouse.

once a year, especially when the main objective is ascertaining annual needs. When the principal purpose of a continuous inventory of supply item is to build up a "use record" in the schools as a basis of intelligent ordering, this result can be accomplished with less effort by maintaining a continuing record of the periodical physical inventories, including a record of amounts ordered, from which is computed the amount used for a given period.

Three special forms are used for such purposes. These are indicated "Inv. 1," "Inv. 2," "Inv. 3" and "Inv. 5" (Figures 12, 13, 14, and 15). Figures 12 and 13 are identical except that they are in two sizes, Figure 12 being a single card and Figure 13 a twofold card. These two forms are used for classroom and janitorial supplies and small equipment. Figure 14 is used for books and small equipment (tools, drawing instruments, and so forth) that are loaned out, to classes usually, and returned at the end of the semester or course. Figure 15 is used for furniture and large equipment and provides for information pertaining to motorized equipment. While provision is made for distribution of items recorded on these forms, in most cases the items are of a type that would not be distributed and few, if any, other than the original entries are recorded. In schools, the principal is the responsible officer for maintaining these records. Once a year, in normal times, the supply and equipment supervisors "spot" check the schools, going unannounced directly to the school to examine the records and make comparisons and checks against the storeroom and classroom stocks and building equipment. When it is deemed advisable, a complete physical count is made. Such checks have resulted occasionally in bringing to light surplus stocks or unused stocks that have deteriorated because of failure to have them put into use at the proper time. Since these continuing inventories have been in use, however, the problem of surplus and deteriorated stock have been almost entirely eliminated. Provision is made in the annual requisitions, by special forms, for having the schools report surplus and obsolete items. These are picked up, appraised and, when found usable, returned to warehouse stock.

In addition to the foregoing forms, separate forms have been provided for all shops under the supervision of the Department of Vocational and Industrial Arts. These forms are designated, as follows: "Continuing Inventory of Supplies" (Figure 16) and "Equipment Inventory" (Figure 17). The items recorded on these forms are not duplicated on any other stock forms and, even though the items are maintained in the school where the principal is the responsible officer, they are under the supervision of the Vocational and Industrial Arts Division. Physical checks are made by the supervisors from the central office of this division at least once a year, frequently twice a year. Because of the highly specialized nature of these items, it has been found more desirable to segregate the records from those of items in general use. Slightly more detail is provided for to meet special needs for replacement, distribution, and life of service.

Municipal Regulation and Theatre Auto-Lots

A Review of Cities' Policies and Attitudes On Providing Off-Street Parking Facilities

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The past fifteen years have seen a tremendous increase in motor vehicle traffic. In 1946, motorized America traveled more than 333 billion vehicle miles, about one-third of this travel was over streets within our city limits. This traffic within our cities varies in direct proportion to the intensity of land use. That is to say, a section of a city which attracts great masses of people may expect heavy motor vehicle traffic during the period of influx of the masses. This is a rather obvious statement and yet it is a condition which has been overlooked by many efficient business organizations.

Theatres attract great throngs of people, particularly in the early evening hours, and a substantial proportion of any theatre crowd makes its way to the theatre in private automobiles. A shortage of convenient parking places will cause potential patrons to turn elsewhere for their recreation—to the outdoor movie or the neighborhood theatre. Therefore, many theatres have found it good business to provide convenient parking facilities for their customers. The Fox Theatre in Atlanta, Georgia, is an excellent example of such facilities. (See 1946-47 THEATRE CATALOG, pages 30 to 32.)

However, many theatres and other forms of land use have been reticent about providing the necessary parking facilities and it has often been necessary for the city to establish requirements based upon the city's zoning authorities.

This paper will present a review of current practices of cities in requiring off-street parking facilities in connection with various types of land uses. A section will also discuss other requirements imposed upon parking lots in order to insure proper operation. It would be wise for any theatre operator to review carefully the zoning ordinances and other regulations governing parking lots before attempting to provide such facilities in connection with his own enterprise.

CONTROL BY ZONING POWERS

Zoning has been described by the United States Department of Commerce as "the application of common sense and fairness to the public regulations governing the use of private real estate[1] . . . it is a part of city planning rather than an entirely separate operation, designed to promote and protect the health, safety, morals, convenience, prosperity and general welfare of the community."[2]

Zoning is most commonly used to control the segregation of commerce, industry, residence, recreation, and other forms of land use. This segregation is aimed at providing better living conditions in each of the various areas devoted to different land uses. Although now in general use, zoning is a relatively new urban regulation.

Recently, a major municipal problem, parking facilities for automobiles, has been attacked through the use of zoning. Sufficient experience has been gained to show that off-street facilities required by zoning provide a uniform, impartial, and effective means of assuring adequate terminal facilities in cities. It is believed that this plan will ultimately be recognized in all cities and that cities will enact zoning ordinances which will assure at least adequate provision of off-street parking facilities to serve traffic loads generated by new businesses. However, it must be understood that the mere passage of a zoning ordinance is not in itself adequate to the relief of parking ills. Effective and impartial enforcement of the provisions of the ordinance is essential; even then, considerable time will elapse in most communities before the parking problem is alleviated through zoning. Zoning ordinances properly written and properly enforced will have a favorable long-range effect upon the parking problem of cities and towns.

Cities with Ordinances

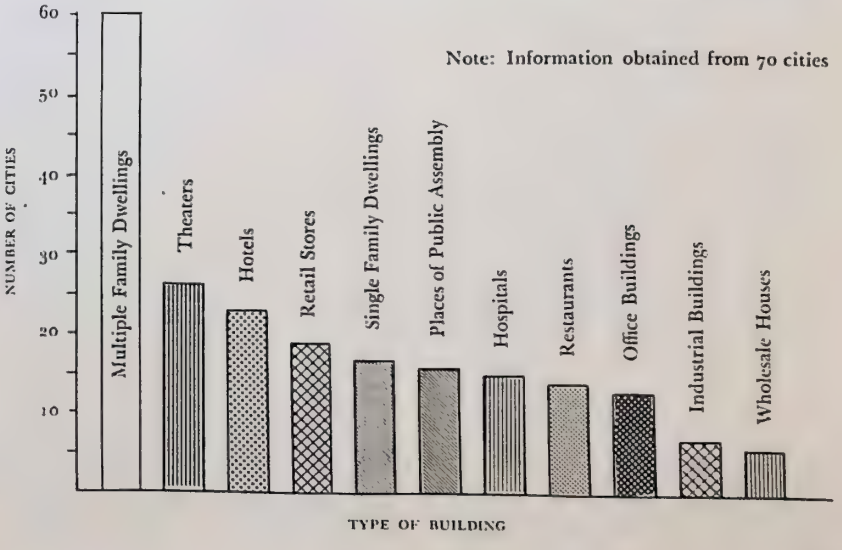
Zoning ordinances requiring the provision of off-street parking facilities in connection with new buildings of various types are found in 70 cities with populations 10,000 and up. These ordinances are found in cities of all sizes and throughout all sections of the country. Theatres rank second only to multiple-family dwellings in the frequency with which they are required by ordinance to provide off-street parking. Figure 1 shows the number of cities requiring parking facilities in connection with new buildings of various types. Note that excluding dwelling units, theatres are most often required to furnish parking facilities in connection with new construction. This is an indication that cities have found theatres to be one of the greatest "generators" of traffic.

The idea of requiring theatres to provide parking space to accommodate the vehicles of its patrons is relatively new. Detroit, Michigan, was the first city of the group studied to place such a requirement in its zoning ordinances. This was done in 1940 when the city adopted an ordinance requiring theatres to furnish one off-street parking space for each ten seats in the auditorium of the theatre.

The requirements vary widely among the twenty-four cities employing ordinances — from one parking space per four seats to one per twelve seats. Several cities require parking space to be furnished on the basis of floor space. Two cities require space for parking equal to the total floor space of the building.

A summary of requirements for cities which impose such ordinances on

FIGURE 1—Number of cities requiring off-street parking facilities by type of building. While 25 out of the 70 surveyed cities require off-street parking facilities for theatres, the idea is relatively new. Detroit was the first city to make such a requirement in zoning ordinances. There, the rules, adopted in 1940, call for one off-street parking space for every 10 seats in the auditorium of the theatre.



[1] A Zoning Primer, U. S. Department of Commerce, 1928.

[2] The Preparation of Zoning Ordinances, U. S. Department of Commerce, 1931.

theatres is given in Table 1.

These requirements are applied to theatres in cities of all sizes. Both New Castle, Indiana, population 17,000, and Los Angeles, California, population 1,800,000, requires one off-street parking space for each ten seats in the theatre. Clayton, Missouri, with 15,000 inhabitants, and Arlington, Virginia, population 125,000 have imposed the same requirement upon theatres—one off-street parking space per four seats.

The requirement of parking spaces based entirely upon the street frontage occupied by a theatre is open to question. The capacity of a theatre does not vary directly with the street frontage occupied. Many large theatres are so constructed that they have no street frontage, but are entered from arcades which run through buildings. Such an arcaded type of theatre would be required to furnish a minimum of off-street parking facilities for patrons whereas another theatre with similar capacity but with different construction features might be required to provide substantially more. Obviously, parking demands will vary with the capacity of the theatre, therefore such an ordinance would not furnish a satisfactory solution.

The major parking demands of a theatre are normally after the closing time of other business establishments in the same section of the city. For this reason, it is sound to allow theatres to take advantage of off-street parking facilities used by other business establishments during the day. Frequently these parking facilities are not in use during the early evening hours when recreation traffic in the city is at its peak, and when demand for parking space by theatre patrons is great.

Detroit, Michigan, is considering a revision of its zoning ordinance relating to theatres which will provide that "not more than fifty (50) per cent of the off-street parking facilities required for theatres may be supplied by off-street parking facilities provided for other kinds of buildings or uses not normally open, used or operated during the principal operating hours of the theatre."

Space Needs for Cars

Any plan to provide parking spaces for theatre patrons must consider the overall space available for such facilities. Into this overall figure may be divided the area required to park one car in order to obtain the capacity of the proposed facility. Information on this subject has been collected from several cities and is discussed below.

TABLE 1—Parking Requirements for Theatres.

Requirements	No. Cities Reporting	Per Cent
1 Parking Space per 4 seats...	4	17.1
1 Parking Space per 5 seats...	2	8.1
1 Parking Space per 6 seats...	1	4.1
1 Parking Space per 8 seats...	1	4.1
1 Parking Space per 10 seats..	4	17.1
1 Parking Space per 12 seats..	1	4.1
¾ Parking Space per 10 seats.	1	4.1
Space equal to floor space.....	2	8.1
1 space per 200 square feet floor area	2	8.1
1 space per 10 feet frontage...	1	4.1
"Adequate"	5	21.0
Total 24		100.0

Of the 70 cities reporting zoning ordinances, 31, or 44 per cent, submitted answers to the question: "How many square feet are required or are considered necessary to provide storage space for a private car?" The answers to this question varied over a wide range, as shown in Table 2.

Two hundred square feet per vehicle is the most common requirement and this was found in cities of all sizes.

Several cities, particularly those with lesser area requirements, have ordinances which require smaller storage areas and "adequate space for entering and leaving." An ordinance so worded leaves the final decision to the land user who in many cases does not have a clear understanding of the requirements of a vehicle. Since the land user is interested in reducing costs, he will, in all probability, allow an absolute minimum of space for such maneuvering, and when the public uses the facility it will require more space which will be obtained at the expense of storage area. Thus the capacity of the lot is decreased. A better plan is to base the requirements on a definite number of square feet for each parking space. This overall figure should be sufficiently large to insure ample room for maneuvering. It must also be remembered that requirements vary widely for different shaped areas and different parking arrangements.

Various plans for parking may be found in the "Traffic Engineering Handbook."[3]

TABLE 2—Off-street area requirements of cities to store one passenger vehicle.

Square Feet Per Car	No. of Cities Reporting	Per Cent
125	1	3.2
126	1	3.2
144	1	3.2
150	3	9.7
160	3	9.7
180	2	6.4
200	13	42.2
220	1	3.2
240	2	6.4
250	1	3.2
300	2	6.4
400	1	3.2
Total.....31		100.0

Site vs. Building Served

Forty-two cities have definite restrictions concerning the location of the parking facility in relation to the building served. Of these cities, 24, or 57 per cent, require the parking facility to be located on the same parcel of land as the building. The remaining cities allow the parking facility to be located at distances up to 1,500 feet from the building served. This information is summarized in Table 3.

An interesting relationship is shown in Figure 2 between the size of cities and the maximum distance from the building to be served at which parking facilities may be located. In 77 per cent of the cities with populations from 10,000 to 25,000 the parking facility must be on the same lot as the building served. In the other cities in this population group, the maximum distance which the buildings and the parking facility may be separated is 300 feet—the average is 275 feet. Cities with populations from 25,000 to 50,000 require in 77 per cent of the cases parking on the same lot as the building served. All the other cities in this group provide that parking must be within 300 feet of the generator. Cities with populations from 50,000 to 100,000 require parking on the same land parcel in 55 per cent of the cases.

One city allows parking to be provided within a radius of 1,000 feet but the average of the maximum distances allowed away from the building served is 540 feet. Thirty-three per cent of the cities with populations 100,000 and over require parking on the same parcel of land as the building to be accommodated. The maximum separation permitted is 1,500 feet. The average of the maximum distances permitted between a building and its parking facility is 700 feet.

CONTROL BY ORDINANCE

Parking facilities in many areas have operated as "fly-by-night" enterprises. Patrons' cars were carelessly handled; damage was done to the body or to mechanical parts; contents were removed; prices were changed without warning. The public in general was given no assurance of receiving fair treatment when patronizing parking lots.

In order to cope with this situation it has become necessary in many cities to enact ordinances regulating all phases of the construction and operation of parking lots. Detroit, Michigan, was among the first cities to adopt such an ordinance, effective in 1928. Since that time many other cities have enacted similar ordinances. The experiences of several years of trial have caused the original ordinances to be revised many times so that there are in existence today ordinances which contain all information necessary to the proper regulation of parking lots. Much time and effort may be saved by a thorough study of such ordinances before any contemplated parking facilities are constructed. A brief review of the types of controls are discussed here. Much of the information contained in the following discussion appeared in the Traffic Quarterly,

TABLE 3—Distance from building at which off-street parking may be provided.

Distance in Feet	No. of Cities Reporting	Per Cent
Same land parcel	24	57.0
200	2	4.8
300	9	21.4
400	1	2.4
600	2	4.8
800	1	2.4
1100	2	4.8
1500	1	2.4
Total 42		100.0

[3] Traffic Engineering Handbook. Hammond and Sorensen, 1941. Available from the Institute of Traffic Engineers, Strathcona Hall, New Haven, Connecticut.

published by the Eno Foundation for Highway Traffic Control.[4]

Licensing Procedure

The cities that exercise the most extensive control over parking lots require that a license be secured. An open parking station is generally defined as "any plot, piece, or parcel of land used for the purpose of storing motor vehicles where the owner or person storing such vehicles is charged a fee and shall include plots where shelters that are not completey enclosed are erected and which are open to the general public."

Most cities do not require a license for lots of less than ten-car capacity. One city provides short-term permits but not for less than two months, the fee to be one-tenth of the annual fee for each month.

Information usually required in order to obtain a license includes: capacity of lot, hours of operation, rates to be charged, and information concerning the individual or organization requesting the license.

Several cities require that the names of parking lot employees be filed with the city. Some cities require a special badge for each employee while others require that all parking lot employees have drivers' licenses.

License fees vary over a wide range, most of the cities basing their requirements on the capacity of the lot being licensed. Cleveland, Ohio, charges a fee of $1 per year regardless of the size of the lot, whereas Kansas City, Missouri, has a fee of $1 per year per car capacity.

Signs Required

Parking lot operators are required to maintain at each entrance permanently fixed durable signs setting forth in legible lettering the name and address of the licensee, the hours of the day and night the place is open, the rates charged, and the closing hour.

Where more than one rate is charged for parking, all figures must be of the same size and dimension, generally not less than 6 inches in height and 3 inches in width. The signs are to be not less than 8 feet or more than 10 feet (12 feet in some ordinances) above the sidewalk, and such signs are not to carry any advertising or other matter except as required by ordinance.

Since these signs are usually erected as close to the street as possible, they must not be allowed to create a traffic hazard by their size, design, or lighting arrangement. All signs should be subject to approval by the police chief or other specified city official. If the lot is a receiving station the sign must give the address of the station to which cars may be moved.

Claim Checks

Many cities require that at the time a car is parked or accepted for parking, the person whose car is parked be given a distinctive check, numbered to correspond with the coupon placed upon the vehicle; the check to contain the name and address of the parking place and (in some cities) the make and license number of the vehicle parked. The form of the claim check usually must be approved by the license commissioner or other official.

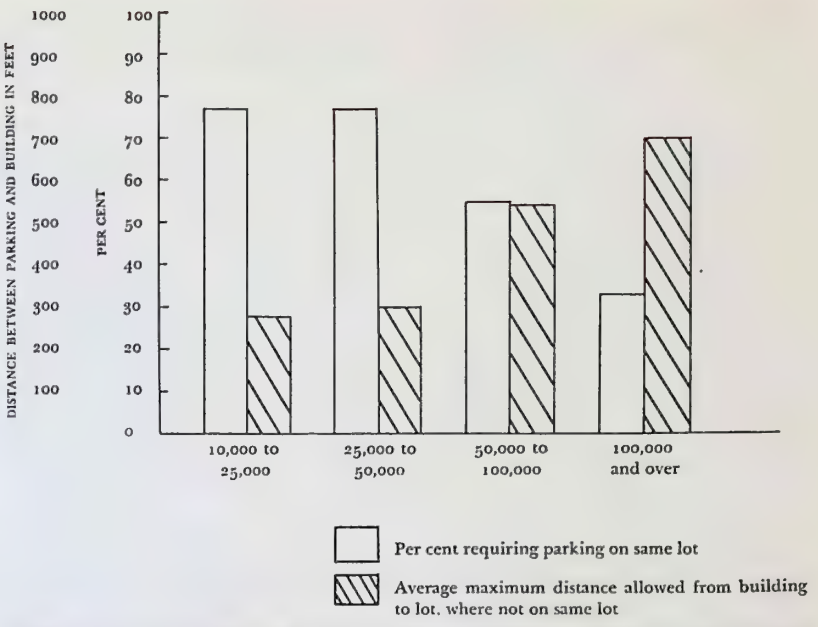


FIGURE 2—Location of parking related to size of cities. An interesting relationship is shown between the size of cities and the maximum distance from the building to be served at which parking facilities may be located. In 77 percent of the cities with populations from 10,000 to 25,000, the facility must be on the same lot as the building; in cities of more than 100,000, the percentage is 33.

Physical Requirements

Parking lots are required to conform to certain minimum standards of layout and construction in many cities. The most frequently regulated physical requirement is the type of surface.

Washington, D. C., requires that lots paved with impervious material be so graded and provided with approved drain that no drainage will flow across the sidewalk. Baltimore, Maryland, requires the entire area of parking lots to be paved with a hard or semihard dustless surface.

Denver requires that if the parking lot is made of dirt, sand, cinders, or other loose material it shall be kept thoroughly sprinkled or treated with oil or some other substance so as not to be carried or blown into the streets, alleys, or other public places.

Parking-lot operators generally are required to keep sidewalks surrounding the parking space free from dirt, oil, ice, sleet, and snow, and in a safe condition for the travel of pedestrians. Operators are prohibited from shoveling snow or rubbish from the parking lot onto the sidewalk or into the street.

Barriers

Open air parking lots generally are required to be enclosed with a suitable fence, wall, or other barrier so that vehicles cannot be removed except through regular entrances and exits. Some cities permit only one entrance and one exit which may or may not be combined, and all openings must be properly attended during the time the lot is in operation.

Lots that adjoin an alley may use the alley as one entrance or exit unless barriers are deemed necessary by the city. The erection of a fence, coping, or barricade on lots abutting public space generally must be done under permit from the city engineer.

Regulations on curb cuts and driveways are adopted separately rather than included in the parking lot ordinance. The usual procedure is to require that an application be submitted, with detailed information including plans drawn to scale. The driveway width allowed ranges from 16 to 30 feet at the lot or sidewalk line. Where application is made for more than one driveway, an investigation is usually conducted to consider the amount of pedestrian and vehicular traffic on the street and sidewalk adjacent to the property.

SUMMARY

This paper has attempted to outline the requirements imposed upon parking lots by cities. Zoning ordinances requiring off-street parking are daily becoming more popular. The great demand for parking spaces requires that cities impose certain regulations in order that existing facilities may operate as efficiently as possible.

No attempt has been made to prove the existence of a problem in providing parking facilities—this was covered in a commendable manner by the American Automobile Association in the 1946-47 edition of the THEATRE CATALOG (pages 14 to 26). Rather is this presentation offered to point out to theatre operators the attitudes of cities with respect to private parking facilities, in the hope that a review of such policies and attitudes may assist theatre owners and operators in properly providing off-street parking facilities in connection with their enterprises.

[4] Orin F. Nolting, "The Municipal Regulation of Privately Owned Parking Lots," Traffic Quarterly, July, 1947, page 268; Eno Foundation, Saugatuck, Connecticut.

Protect Your Signature as If It Were Cash

How to Handle the Kinky Penman Who Wants The Motion-Picture Exhibitor's Autograph

ROY LEE MARTIN

"Never sign a paper for a stranger" is my advice to the motion-picture exhibitor. This advice is based on my twenty-eight years of defrauding innumerable victims with a clever and resourceful pen. No calligraphic swindler could operate with success were this recommendation adopted without any exceptions being made.

Equally important is to forget your belief that beautiful handwriting denotes an honest character. While not every penman is an expert chirographist, intriguing letter formations are the core of his crooked game. He also relies on the appeal they make to your esthetic sense.

Be suspicious of any approach which seems to offer you more than a normal or conservative profit. One of the kinky penman's strongest working points is to offer you something for nothing. Be very chary of so-called good things—of long, involved yarns with a glitter to them at the end. To get you to bite like a fish, the kinky penman and calligraphic swindler tosses out attractive ideas, leads, or words.

Since your signature means so much to your own protection, it is foolhardy to part with it too easily or on terms which are vague at the beginning. Transactions which seem to spring from nowhere at you, and seem attractive, are best ignored.

If, at the beginning of any flashy or questionable deal, you communicate your suspicions to the proper authorities, explaining to the professional penman that you never accept such a proposition without first making the fullest investigation, you will not get a follow-up visit. Clever as the professional penman is, he runs too much risk of the law closing in on him, to continue his resourceful verbal artillery on the alert business man or woman.

The kinky penman, even if subtle, works fast. He lets no grass grow under his feet, as it were. The final or closing contract he makes with his victim will be timed to lightning speed, although it may not be obvious to the victim unless he is on guard.

KINDS OF STRANGERS

Two kinds of strangers occasionally approach you. The first are harmless sheep, who are in the majority, and prowling wolves, who are in the minority. How can you separate the sheep from the wolves? Easy enough—figure out some harmless devices to induce reactions from such strangers. You may toss a pointed question. Write a conclusive answer, if you must write. Telephone your lawyer or the police department, depending on circumstances.

You may, in the course of this performance of meeting fire with fire, uncover or detect a movement, gesture or word amounting to a deciding slip if the stranger is out to take or make you for your hard-earned cash. On the other hand, any honest stranger will react as any honest person does, so there will be no harm done.

COMPLICATED DEALS

In a more complicated deal—one with greater stake in prospect—the professional penman is likely to use one of your distant relatives, a close friend, or a business acquaintance as an introductory foil. Whether the crook actually made this preliminary contact and got the desired recommendation, or whether the crook is bluffing his way, is beside the point. The real point is this: The relative, friend, or acquaintance may have easily succumbed to the crook's personal charm and his plausible interview; or if the crook found the initial approach tinged with a bit of suspicion he may have made an alternative proposition—harmless on the surface—to win confidence and a signature on a piece of paper.

What you will subsequently be permitted to see is a duplication of that relative's signature appended to a glowing recommendation or testimonial. The switch or fake has been made in the interim. You are not to know that, so the signed okay impresses you a lot. Think a bit at this stage. The caller before you still has the status of a stranger; you have never dealt with him before.

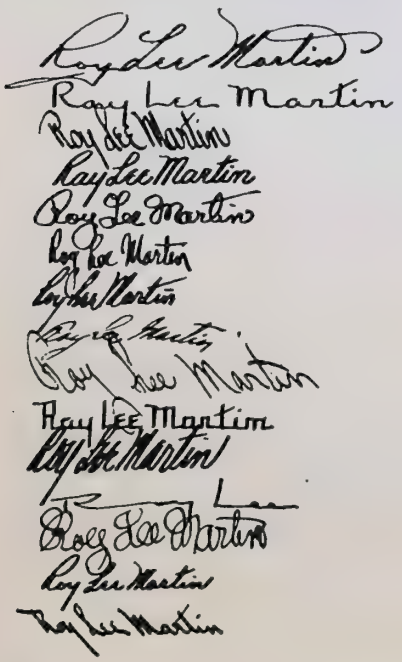
DON'T PAY IN ADVANCE

In any legitimate business transaction you either establish a credit rating or pay cash on delivery of the merchandise or completion of the service; never in advance, as this stranger wants you to do. There are, of course, exceptions to such business and professional customs, but you know the organizations are reputable; and you know, too, the traveling representatives. Perhaps they established their confidence by calling on you six times in six months. Between visits, letters and literature soliciting your business bobbed up in the mail. You also noticed their advertisements in the trade journals.

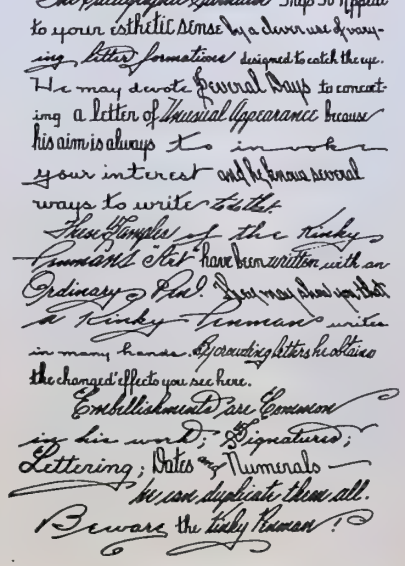
By way of contrast, no stranger with crooked intentions would persevere for six whole months. And six separate visits—perish the thought! Neither would he use the United States mails, since he would become embroiled with the federal government, which never forgets its man, and doles out sentences more severe than most of the states, counties, and municipalities.

The safest way to handle a stranger of the type described above is to completely ignore the relative, friend, or acquaintance forming the introductory

THE AUTHOR SIGNS HIS NAME! Practically all styles of penmanship are represented in this sample, indicating how easy it is for the kinky penman to duplicate any signature he can obtain.



THIS ENTIRE PIECE of copy was written by the author, showing how easy it is for the skilled calligraphic swindler to duplicate any piece of writing he can turn to his own devious ends.



buffer. If you choose for yourself, you simply cannot go wrong. Listen to the stranger and the odds are ninety-nine to one that you will be taken to the cleaners.

GANG JOBS

When a paper racket is worked by a crew or gang, a visit from one stranger will pave the way for another. Depending on the proposition, there may not seem any obvious connection; or if it appears to be done quite openly, the objective is to break down your resistance. If one stranger requires caution, two require double caution to combat such high-pressure tactics.

Beware of highly-embellished papers or documents tendered by an absolute stranger. The simple device of having warehouse receipt procedure altered to bear counter-signatures would be increased protection against that type of fraud, since it is harder for the kinky penman to obtain two signatures than just one.

OTHER FAKED PAPER

The swindling scribe exploits the press far more than is generally known. Want advertisements of all kinds are carefully scanned for information about prospective victims.

The treasure map swindle—a beautifully-executed gyp done with the pen—is frequently put over in the waterfront cities, on both the Atlantic and Pacific coasts. In an operation of this kind in New Orleans, I managed to find several supposedly hard-boiled business men gullible enough to hand over the cash. I find it amazing to look back and recall that these prominent citizens did not report matters to the police for fear of unfavorable newspaper publicity! This made it easy for me to succeed without being involved with the law.

From published autobiographies, chirographic textbooks and from magazines and Sunday feature sections of newspapers, the swindler carefully copies autographed letters with dexterous pen on "aged" paper. If the professional collector he approaches is skeptical or suspicious, he will turn to a non-collector. Any business man of the type to neglect culture while piling up the dollars is likely to be susceptible to a dazzling array of autographed letters written by celebrities, past or present. Even when he has no desire to own same, he may accept the letters as collateral on a loan or in payment for a product or service the swindler particularly needs.

NOTE TO EXHIBITORS

This, the next paragraph, is written for the benefit of the motion-picture exhibitor who has farmers among his relatives, friends, and patrons. The professional penman periodically visits prosperous rural sections. Fake certificates, handsome-looking and impressive, are his products. He find out who owns the largest farm, and then proceeds to tackle the neighboring farms. His basic sales point is in mentioning that the largest local farmer has purchased some of his parchment. This "keeping up with the Joneses" human weakness breaks down any resistance to his lists of "Pedigreed Stock," "Master's Certificate of Dairy Inspection," and "Land-owner's Certificate of Ownership."

GENERAL PRECAUTIONS

Keep your blank checks and other paper of the authorization type under lock and key. The professional penman is, in addition to his other talents, light-fingered. If you make it difficult for him to obtain the essentials he needs to defraud you with, how can he possibly succeed? Why he does succeed so often is because the average business or professional man or woman is careless in protecting his or her possessions.

In another part of this article I indicated the professional penman's reluctance to flirt with the U. S. Postal Service. The closest some swindlers come to it as a means of establishing an advance contact, or gaining an interview with a hard-to-approach victim, is to post unstamped letters in mail boxes of individual residences and apartments, and under the doors (if there are no mail slots) of stores and offices. Any "mail" of this nature received from a stranger should not only be carefully examined, but be investigated by the postal authorities, before replying to it. The motive may be the handwritten signature on your letter of reply.

CONCLUSION

The list of "paper possibilities," treated with varying fraudulent techniques, is quite limitless. After allowing for the minority "resting" in prisons, there are about thirty thousand active kinky penman, all dangerous to the collective American purse.

In brief, to defeat, avoid, and thwart the professional calligraphic swindler and kinky penman is to remember that he operates through tricks. And the soundest protection against tricks is to be ever on your guard.

Even if you do carry protective insurance, and become careless from the knowledge that the "company will make good any loss," it will not save you from being talked about as a "perfect chump" by your associates and neighbors.

WITH THE SAME PEN, and in the same manner of the other examples, the author of this article wrote this brief explanation of the kinky penman. With a variety of writing instruments, it takes no imagination to appreciate what an amazing variety of handwriting can be duplicated. The author is very well qualified to point out the tricks of this trade, having spent a score of years at it himself!

A Kinky Penman knows many tricks.
Here are a few of mine, written with an ordinary pen in about five minutes time.

At first glance it appears that these five lines are the work of several hands, but a study of the letter formations will show they are the work of one person.

The Calligraphic Swindler can and will vary his writing — and it — add pressure, slope it and write fine, then it this way or this way, or he may write straight.

Sometimes he uses Embellishments — broad Lettering, etc.

But the careful man will never sign a paper for a stranger!

The calligraphic Swindler wants your signature to perfect a steal so — Beware the kinky Penman — he is Dangerous!!

Two Operating Forms for Keeping Records

Keeping Tabs on Advertising Accessories And Cooling Systems Promotes Efficiency

Although there are presently on the market a multitude of business forms, covering about every imaginable facet of a business, there comes a time when a new and different form—at least, a form better adapted to a specific use—is highly desirable, and then, necessity becoming the mother of invention, a theatreman will devolop one that excellently meets his requirements.

Two such forms have been received by the editors. So worthy are they of wider use permission has been obtained to present them. Harry Schad, operating the Astor and Strand Theatres, in Reading, Pennsylvania, felt that no existing form gave him the record he desired, either anent the advertising accessories returned for credit or the true chronicle of operating his air-conditioning system.

The form entitled "Advertising Accessories Returned for Credit" lists all the critical data needed for a permanent record on any particular picture, and presents the material in such a way as to be immediately available. The regulation 8½x11 mimeographed form can be easily filed in the standard letter file, and thus, with a minimum amount of time, trouble, and space, become a part of the theatre's permanent record.

The cooling system record has several uses beyond the mere fact of showing exactly the hours during which the system was in operation—and that period in reference to the time the house was open.

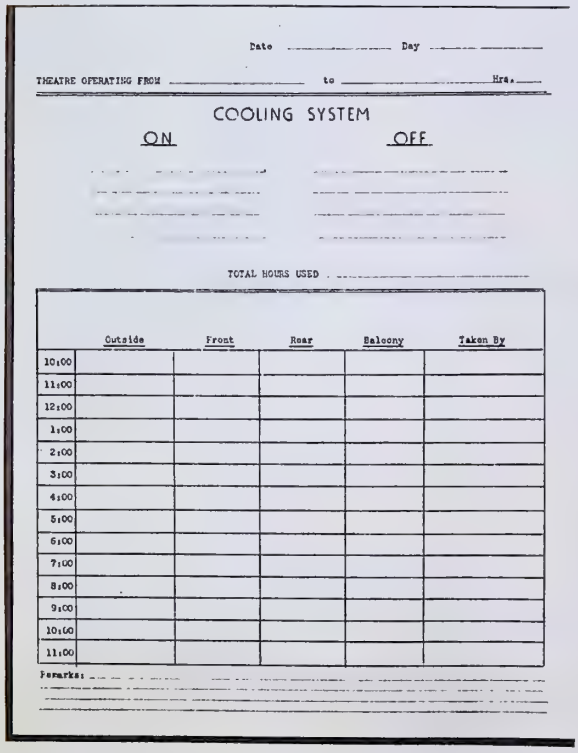
The main body of the report provides for recording the outside temperature along with the temperatures at three critical spots in the theatre and initials of the observer. First of all, from this record, an idea can be obtained on the use of the system in reference to the actual needs as determined to a large extent by the outside temperature.

Too frequently too little attention is paid to the actual comfort conditions in a theatre, and particularly the inside conditions in reference to those obtaining outside. In this record, a quick check of the inside and outside temperatures will indicate whether the proper differential has been maintained, since the one-time "20 degrees colder inside" announcement is far from being a justifiable criterion against which to operate a cooling system, either from a standpoint of economy or patron comfort.

Perhaps the greatest value of this form, so far as the theatre management is concerned, is that it forces hourly checks. Where a permanent record is not required, it is very easy—and not necessarily with malice aforethought—to say "I checked" even though actually it is a case of "I think I checked." Hence, with this permanent record, the fact of continuity required necessitated this checking job be done in fact. And through such a record, it can be shown who, accidentally or otherwise, permitted to prevail a condition of too much cold or too much heat. In winter, of course, the form can be adapted to the heating system.

It is forms such as these—developed to meet a particular need—provided, of course, that their purpose is genuinely achieved — that indicates progressive management of the sort that looks to pennies so that dollars will take care of themselves. Here, in the accessories form, is a good example of the care in detail that helps to eliminate needless waste, and, in the cooling system form, a good example of the care in detail that helps the patron to be pleased and become convinced, however unknowingly, that there indeed is a place of solid, relaxing comfort.

Here, indeed, are two forms that can, either as is or in a manner adapted to more restricted use, be employed to good advantage by almost every thoughtful theatre operator.



Date _____ Day _____

THEATRE OPERATING FROM _____ to _____ Hrs.

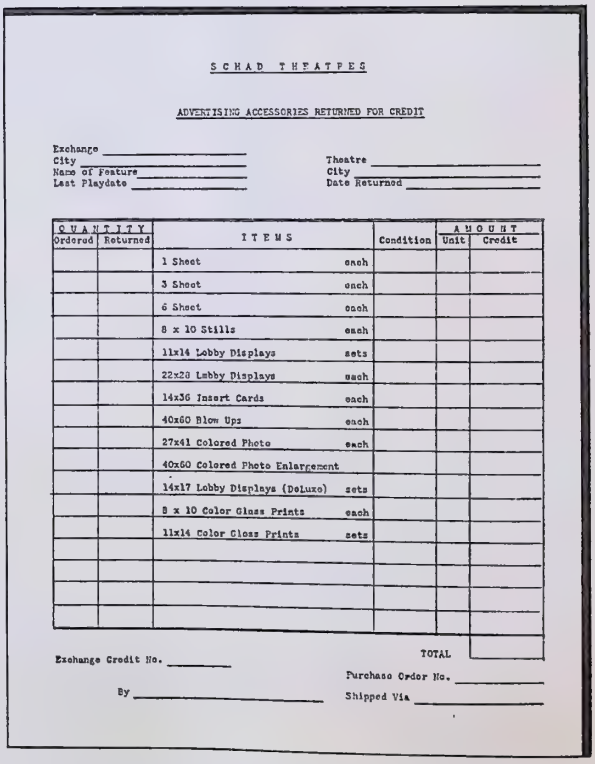
COOLING SYSTEM

ON OFF

TOTAL HOURS USED _____

	Outside	Front	Rear	Balcony	Taken By
10:00					
11:00					
12:00					
1:00					
2:00					
3:00					
4:00					
5:00					
6:00					
7:00					
8:00					
9:00					
10:00					
11:00					

Remarks: _____



SCHAD THEATRES

ADVERTISING ACCESSORIES RETURNED FOR CREDIT

Exchange _____ Theatre _____
City _____ City _____
Name of Feature _____ Date Returned _____
Last Playdate _____

QUANTITY Ordered	QUANTITY Returned	ITEMS		Condition	AMOUNT Unit	AMOUNT Credit
		1 Sheet	each			
		3 Sheet	each			
		6 Sheet	each			
		8 x 10 Stills	each			
		11x14 Lobby Displays	sets			
		22x28 Lobby Displays	each			
		14x36 Insert Cards	each			
		40x60 Blow Ups	each			
		27x41 Colored Photo	each			
		40x60 Colored Photo Enlargement				
		14x17 Lobby Displays (DeLuxe)	sets			
		8 x 10 Color Gloss Prints	each			
		11x14 Color Gloss Prints	sets			
					TOTAL	

Exchange Credit No. _____ Purchase Order No. _____

By _____ Shipped Via _____

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—for the THEATRE EXECUTIVE

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- BOOKKEEPING and CASH CONTROL
- TAX and PAYROLL RECORDS

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(Item No. B.S. 3)



BETTER MANAGEMENT with TRAINED Employees.

Price: 5c each or 25 for $1.10

● Of inestimable value in "breaking-in" a new staff of Ushers; a new Cashier, or a new Door Man.

● This 16 page pocket size (3 x 6 inch) booklet with heavy paper cover itemizes the rules of conduct for the theatre staff very logically and thoroughly. Separate chapters are devoted to Managers, Cashiers, Door Men, Ushers, etc., as currently trained in the larger circuits.

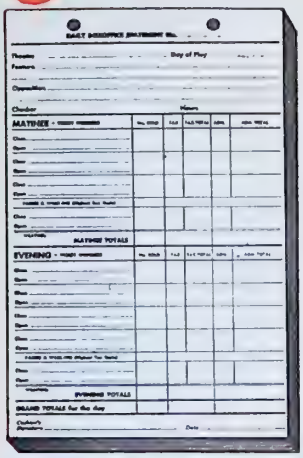
● It also pictures a system of Usher's hand signals for designating empty seats and gives many hints on Public Safety, Accident, Fire Prevention, and Advertising, etc.

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All sales prepaid — but sold under a money-back guarantee of satisfaction!

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● Printed on both sides so that complete factual totals for one day can be kept on one 8½ x 5½ inch sheet, each itemizes:

1. OPENING AND CLOSING TICKET NUMBERS
2. PASS AND WALK-IN TICKET NUMBERS
3. CASH TOTALS
4. TAX TOTALS
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● Made up in pads of 50 per pad, each sheet is punched for saving in a standard ring binder with the date at the lower right corner for quick reference when filed.

50 SHEETS PER PAD AND PUNCHED FOR RING BINDER

Price (per pad): 25c each
or 10 pads for $2.00

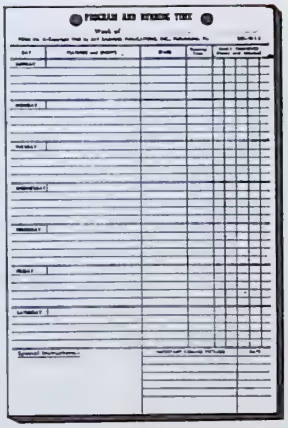
6 WEEKLY PROGRAM SCHEDULES

(Item No. B.S. 6)

● These forms are prepared for convenience in disseminating accurate information to the key member of a theatre staff so that they may answer intelligently the patron questions most frequently asked; or so that they can cue and time their show.

● Daily turnover running times can be easily computed from the running times of the individual subjects that make up the bill.

● One copy each week: (1) on your desk, (2) to your cashier, (3) to your doorman, (4) to your projectionist, and (5) to your head usher or floor supervisor will be sufficient to keep uniform information throughout the theatre.



50 SHEETS PER PAD AND PUNCHED FOR POSTING

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(Item No. B.S. 7)

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Price (without forms): .. $5.00 (inc. Tax)

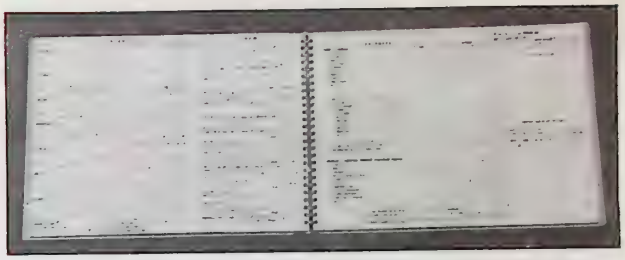
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The same size and design as the above, only made of Cowhide leather for those who want the genuine leather appearance and feel.

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9 Weekly PETTY CASH SYSTEM

(Item No. B.S. 9)



Prices: Voucher Pads (100 to the pad): 20c

Special Envelopes: 50 for $1.00

A specially designed 3 x 5 inch voucher slip — and a special envelope to prevent their loss.

● Petty Cash Slips require a counter signature of approval and are numbered consecutively so that accurate records can be kept of each individual expenditure.

● The specially designed envelopes are for use only once each week in listing each individual slip and computing the weekly total expended. All slips listed on a particular envelope should then be inserted in it for safekeeping: and the envelope filed for future reference.

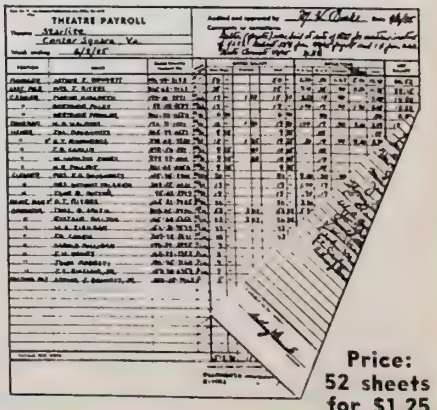
● There can never be any later question of a particular disbursement, for the actual receipt is always on hand and easily located.

10 Weekly PAYROLL FORMS (Item No. B.S. 10)

The system that is modeled after those in use by most major circuits.

● Designed to be filed in the ordinary letterhead size cabinet (8½ x 11 inches) this form provides a permanent weekly record of the individual name, social security number, rate of pay, overtime pay, reasons for overtime, and deductions for all purposes. It also provides gross weekly totals of salaries, deductions, raises, etc. **One of the most important features is an individual signed receipt by each employee, without their being able to see what any other employee has earned.**

● Such an auditable form is for the benefit of the manager and the owner.



Price: 52 sheets for $1.25

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- The warehousing facilities and shipping room staff of THE EXHIBITOR BOOK SHOP are then turned to the service of these *Subscribing Theatres* in order to rush all orders to them properly wrapped and labeled.
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Enclosed find: $2.00 for 1 year ☐; $5.00 for 3 years ☐; or bill me ☐.
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I would also like to see actual sample sheets of No.....

THEATRE or FIRM NAME.....

MAILING ADDRESS.....

CITY..... (P. O. Zone)..... STATE.....

If you wish this addressed to an individual, please fill in the following:

NAME..... TITLE.....

We KNOW you'll like and use it !

MISCELLANEOUS TYPES of OPERATION

1947-48

Management and Policy for the Art Cinema

In Competant Hands, Specialized Operation Can Be Financially, Culturally Profitable

G. F. NONAMAKER
Editor of BETTER MANAGEMENT *and Associate Editor of* THE EXHIBITOR

In the face of overwhelming trade opinion to the contrary, there is still a minority which believes that specialized operation of so-called art movie houses should prove profitable in both the financial and cultural sense.

Granting that there is little negative argument to the question as to whether the cinema is one of the art mediums of our day, the problem narrows down as how best to operate such a venture.

It goes without saying that one should steer far and wide from all the standard and generally accepted methods of average motion-picture advertising, exploitation, and ballyhoo; and veer definitely and decidedly to the ultra-conservative and dignified type of selling usually used by the concert and legitimate stage. All newspaper advertising, posters, window cards, programs, brochures, trailers, and so forth, should be definitely directed toward the intelligensia you are endeavoring to reach; and not toward the generally accepted 12-year-old intelligence level of the patron of the usual Hollywood film fare.

PLAN OF OPERATION

There is no discernible reason why such a specialized operation could not prove worthwhile in most large cities, provided it is handled properly, with a subscription program the basis of an advance sale guaranteeing approximately from one-half to three-quarters of capacity, and the drop-in business covering the balance.

The body of a suggested subscription letter, to be signed by the management, follows:

"We find your name listed with us as one who patronizes the more advanced, cultural attempts of the theatre. And since the motion picture as an art medium should also fall into that category, we are offering you the first opportunity to obtain subscription tickets for our Art Film Festival at the _____ theatre, this city, beginning _____ (date).

"This series of twelve artistic motion-pictures from all over the world represents the absolute best in cinema. Each and every film on the festival's program has met with critical acclaim both here and abroad.

"The public sale of tickets begins _____ (date). If you send your check now, you will have the choice of seats and performances; and will have the honor of becoming a charter member of The Art Film Festival Guild.

"We sincerely believe that our holding this Art Film Festival will be a significant event in the motion-picture history of _____ (city).

"Hoping you will share our enthusiasm —but awaiting your opinion with interest—we remain . . ."

Without the subscription sales partially to subsidize this policy, art cinemas have flourished in large numbers in New York for years. A few have been successful elsewhere throughout the country, particularly in the Nation's Capital, Chicago, and other large cities, and on the West Coast. Perhaps, just as many have flopped. The failures can be analyzed; but usually it all narrows down to inaffective know-how in their operation and in many cases lack of sincerity or faith in the undertaking and with the first signs of waning patronage and subsequent diminishing of box-office receipts the signal for their managements resorting to other not-so-artistic policies. In so far as the records show, no one has attempted to better the artistic level of this medium along the lines herewith outlined.

The Park Avenue Theatre, New York, a perfect type of house for such an operation, both as to appointments and location, made such an attempt but before the subscription sale was fully consummated the house was sold to other operators for an entirely different type of operation.

In some situations it might be feasible to get close to the desired dignity of legitimate-theatre operation by actually renting a legitimate house for your subscription basis film festival; running it one or two weeks monthly as your advance sales might dictate.

When the switch over to an art policy is contemplated in a regular former movie house; the theatre should be refurbished, made as dignified and attractive as possible in appearance and in creature comfort with sound, projection, and so forth at perfection.

The location of a house for this type of operation should not prove an insurmountable problem, since the subscription sales, if successful, will guarantee a percentage of city-wide patronage. But, of course, a central city location is best.

In working up your mailing list do not overlook foreign language groups and colleges, as well as patrons of the arts and all others whom you assume would be interested in this type of film fare.

Don't overlook advertising in the foreign press, those printed in English as well as those published in the foreign tongue, particularly on the Russian- and Palestinian-made product whose advertising should be placed in not only the Russian- but the Jewish-language dailies and weeklies. These papers have been found to reach many who would not otherwise be attracted to your house when it is playing films from these countries.

One can best establish the type of policy as to hours of operation individually; but generally on an overall basis the ten performances a week on a legitimate theatre plan might prove the best. This would mean once nightly, a mid-week matinee, Saturday matinee, and matinee and night on Sundays, since you are not bound by restrictions of blue laws which in many cities prevent legitimate shows from playing on the Sabbath. However, the entire plan can be worked into a continuous-policy operation nicely. When a legitimate house is not available for a full schedule, it might be possible to make use of it on Sundays when the regular legitimate attraction cannot play.

To add a further aura of class to this type of endeavor, the use of printed, reserved seat tickets might prove the better policy, although the membership card, punched each time it is used, and the sale of unreserved seats at the box office on the day of showings can likewise be adopted without detracting anything from your dignified operation.

In other spots, particularly smaller towns, where such an art policy might not ever prove profitable regular film fare, the regular motion-picture operator might find value in a "Movie of the Month" idea worked along the same subscription lines with the attractions playing two or three days at a time.

Most of the films scheduled for the film festival, it will be noted, have pretty lengthy running times. This will usually enable you to present them and them alone as the complete program. This is important in such a specialized operation. The people who come will not want to sit through a flock of short subjects, no matter of how high a quality. Consequently, it will be to the advantage of such an operation to show the feature and that alone, starting the shows usually at 2:30, 2:40 or 2:45 for matinees; and 8:30, 8:40, or 8:45 for evenings so that you will end somewhere near the 4:45 p. m. or 10:45 p. m. hour. In the event a short or so is needed to fill out running time, make sure the shorts are from the same country as the origin of your feature and run them first, with a brief intermission, say 5 or 10 minutes, before starting the main feature.

Motion-picture critics and reviewers on the metropolitan New York newspapers, in fan magazines, news magazines, and even in the trade papers have consistently looked with favor upon the high artistic level of the foreign films, which are the backbone of the international film festival. It is certainly wise to capitalize upon their criticisms, and in a few well directed words stamp the acclaim the films being shown have received.

If the theatre is equipped with a lounge, an art exhibit in the nature of a one-man show by a known local artist can always be held without detracting from your screen attractions; but adding prestige and good-will to the opera-

tion. This should also be good for additional newspaper writeups and further entrench or establish the theatre on the arty side. It might also attract an additional group of those you are most desirous of reaching. If possible, it would be in keeping to have an exhibit by a Russian artist during the showing of a Russian film, an Italian artist during the showing of an Italian film, and so forth.

THE PICTURES

It also goes without saying that screen fare for such an operation should steer clear of anything save the very artistic best that the motion-picture industry of all the world has to offer. With war restrictions of shipment and production off, there is more than sufficient product available for one to select only the very best from France, Italy, Russia, England, and other foreign sources—plus a super-critical selection of several outstandingly meritorious American-made films.

Film Distributors

A trip to New York to book and line up product may be necessary, since the distributors of foreign products are located there, and it is oft times difficult to consummate satisfactory deals with them by mail.

A partial list of foreign product sources located in New York follows:

Belgian

DISTINGUISHED FILMS, INC.
229 West 42nd Street
MAGE FILMS
240 West 42nd Street

Chinese

LEO SELIGMAN
729 Seventh Avenue

Czechoslovakian

KAPIT

English

ENGLISH FILMS, INC.
1560 Broadway

French

A. F. FILMS, INC.
1600 Broadway
A. F. E. CORPORATION
1270 Sixth Avenue
CINE-ART COMPANY
117 West 48th Street
CINE CLASSICS, INC.
117 West 48th Street
CONTINENTAL FILM COMPANY
250 West 57th Street
LEO B. COHEN
150 West 49th Street
DISTINGUISHED FILMS, INC.
229 West 42nd Street
DUKE INTERNATIONAL CORPORATION
545 Fifth Avenue
HOFFBERG PRODUCTIONS, INC.
620 Ninth Avenue
LOPERT FILMS, INC.
148 West 57th Street
MAGE FILMS
240 West 42nd Street
MAYER-BURSTYN, INC.
1481 Broadway
JACOB MILLARD
729 Seventh Avenue
LEO SELIGMAN
729 Seventh Avenue
SIMPEX COMPANY
1564 Broadway
SIRITZKY INTERNATIONAL PICTURES CORPORATION
250 West 57th Street
SUPERFILM DISTRIBUTION CORPORATION
52 Vanderbilt Avenue
TRICOLORE FILMS, INC.
350 Fifth Avenue
VOG FILM COMPANY
229 West 42nd Street
WESTERN HEMISPHERE FILMS, INC.
229 West 42nd Street

Greek

DON AVLON MUSIC AND ENTERTAINMENT BUREAU
225 West 34th Street

Hungarian

DANUBIA PICTURES, INC.
729 Seventh Avenue
LEO SELIGMAN
729 Seventh Avenue

Indian

MAYER-BURSTYN, INC.
1481 Broadway

Irish

MAYER-BURSTYN, INC.
1481 Broadway

Italian

CONTINENTAL FILM COMPANY
250 West 57th Street
DISTINGUISHED FILMS, INC.
229 West 42nd Street
EUROPEAN COPYRIGHT AND DISTRIBUTORS
151 East 51st Street
EXCELSIOR PICTURES CORPORATION
723 Seventh Avenue
FILM RIGHTS, INC.
1600 Broadway
HOFFBERG PRODUCTIONS, INC.
620 Ninth Avenue
LOPERT FILMS, INC.
148 West 57th Street
MAYER-BURSTYN, INC.
1481 Broadway
SATURNIA DISTRIBUTING CORP.
358 West 44th Street
SIMPEX COMPANY
1564 Broadway
SUPERFILM DISTRIBUTION COMPANY
52 Vanderbilt Avenue
TIMES FILM CORPORATION
WESTPORT INTERNATIONAL, INC.
140 West 57th Street
WORLD WIDE FILM CORPORATION
1600 Broadway

Mexican

CLASA-MOHME, INC.
723 Seventh Avenue
SIMPEX COMPANY
1564 Broadway

Palestinian

KLINE-LEVIN
1501 Broadway

Polish

HOFFBERG PRODUCTIONS, INC.
620 Ninth Avenue
INTERNATIONAL FILM FOUNDATION, INC.
1600 Broadway
LEO SELIGMAN
729 Seventh Avenue

Russian

ARTKINO PICTURES, INC.
723 Seventh Avenue

Spanish

HOFFBERG PRODUCTIONS, INC.
620 Ninth Avenue
LOPERT FILMS, INC.
148 West 57th Street
LEO SELIGMAN
729 Seventh Avenue

Swedish

LOPERT FILMS, INC.
148 West 57th Street
OXFORD FILMS
1819 Broadway
SAGA FILMS, INC.
501 Madison Avenue
SCANDIA FILMS, INC.
220 West 42nd Street

Available Films

It is suggested that you do not play old product or re-issues; but as long as your films are first run in your cities and the prints are in satisfactory condition, their age will be of little significance.

A subscriber's popular request program can also be worked out on the basis of showing the film receiving the most votes by ballot.

Proof that there is a plentitude of this type of product from which to choose in booking a film festival is found in the following which is summarized from an issue of THE EXHIBITOR'S Servisection Check-Up covering foreign films reviewed during an eight-month period.

ANGEL AND SINNER — Micheline Presle, Louis Salou, Palau—Good French entry—85m.

ANYTHING FOR A SONG—Ferruccio Tagliavini, Carlo Campanini, Vera Carmi—Will have to depend on the Tagliavini draw—76m.—(Italian).

BARBER OF SEVILLE, THE—Ferruccio Tagliavini, Tito Gobbi, Nelly Corradi—High rating Italian entry—110m.

BEFORE HIM ALL ROME TREMBLED Anna Magnani, Gino Sininberghi, Edda Albertini—Good Italian entry—105m.

BELLMAN, THE—Lucien Coedel, Fernand Ledoux, Renee Faure—Excellent French import—95m.

BLUE VIEL, THE—Gaby Morlay, Elvire Popesco, Marcelle Geniat—Fair French import—91m.

BROTHERS OSTERMAN, THE—Adolf Jahr, Artur Rolen, Emmy Hagman—Good Swedish import—105m.

CAGE OF NIGHTINGALES—Noel-Noel, Micheline Francey, Georges Biscot—Interesting French drama—87m.

CHILDREN ON TRIAL—Enacted by non-professionals—Fair entry for the specialty houses—61m.—(English).

COLONEL CHABERT—Raimu, Marie Bell, Aime—Good French entry—92m.

DEVIL'S ENVOYS, THE—Arletty, Jules Berry, Marie Dea—Good French import for the art houses—118m.

FAREWELL, MY BEAUTIFUL NAPLES — Fosco Giacchetti, Vera Carmi, Clelia Matania—Fair Italian entry—94m.

FORBIDDEN MUSIC—Maria Mercada, Tito Gobbi, Guiseppe Rinaldi—High rating Italian entry—93m.

GIRL OF THE CANAL, THE—Jenny Laird, Bill Blewett, May Hallatt—Okeh English import for the specialty houses—18m.

GREAT DAWN, THE—Pierino Gamba, Renee Faure, Rossano Brazzi—Top-notch Italian entry—83m.

GREEN COCKATOO, THE—John Mills, Rene Ray, Robert Newton—Average British entry—65m.

HER FIRST AFFAIR—Dannielle Darrieux, Jacqueline Desmarets, Rosine Luguet—Pleasing French entry—92m.

IVAN, THE TERRIBLE—Nikolai Cherkassov, Ludmilla Tselikovskaya, Seraphima Birman—High rating Russian entry—95m.

KING'S JESTER, THE—Michael Simon, Rossano Brazzi, Maria Mercader—High rating Italian entry—92m.

L'ATALANTE—Dita Parlo, Jean Daste, Michel Simon—Fair French-made art house entry—80m.

LAUGH PAGLIACCI—Alida Valli, Beniamino Gigli, Paolo Hoerbiger—Pleasing Italian entry—82m.

LIFE BEGINS ANEW—Fosco Giachetti, Alida Valli, Edoardo De Filippo—Good Italian entry for the art houses—88m.

LITTLE MARTYR—Emilio Cigoli, Luciano De Ambrosis, Isa Pola — Fair Italian import—91m.

LUCREZIA BORGIA—Edwige Feuillere, Gabriel Gabrio, Aime Clariand—Good French entry for the art houses—88m.

MARCO VISCONTI—Carlo Ninchi, Mariella Lotti, Roberto Villa—Good Italian import—109m.

MIDNIGHT IN PARIS — Raimu, Aime Clariand, Charles Granval — Fair French import—90m.

MURDERER LIVES AT 21, THE—Pierre Fresnay, Suzy Delair, Jean Tissier—Import is okeh for specialty houses—83m.—(French).

MY FATHER'S HOUSE—Ronnie Cohen, Irene Broza, Izaac Danziger—Intense drama will need plenty of push—85m.—(Palestinian).

NAIS — Fernandel, Jacqueline Bouvier, Henri Poupon—Fair import—102m.—(French).

NUREMBERG TRIALS, THE — Produced by Roman Karmen; directed by O. Svilov—Powerful documentary — 58m.—(Russian).

PAGEANT OF RUSSIA—Photographed by 26 camermen under the direction of Sergei Yutkevich. Delegations representing the 16 Soviet Republics—Good documentary for the art houses —50m.—(Russian).

QUEEN'S NECKLACE, THE—Vivianne Romance, Marion Dorian, Maurice Escande — Well-made French import — 105m.

RED HEAD—Harry Baur, Robert Lynen, Colette Segall—Excellent French reissue—92m.

ROAD HOME, THE—Oleg Zhakov, Anna Smirnova, Nikolai Chibbius — Well-made Russian import—90m.

RUSSIAN BALLERINA—Maria Redina, Vladimir Kazanovich, Nadai Yastrebova—Good Russian import—75m.

ST. FRANCIS OF ASSISI—Jose Luis Jimenez, Alicia De Phillips, Antonio Bravo—High rating Mexican religious drama—119m.

SCHOOL FOR DANGER — Jacqueline Nearne, Captain Harry Ree, Wing Commander E. Baird, and members of the French Resistance—Fair documentary for the specialty houses—68m.—(English).

SCHOOLGIRL DIARY—Valli, Irasema Dilian, Andrea Checchi—Good Italian entry for the art houses—92m.

SHE RETURNED AT DAWN—Dannielle Darrieux, Pierre Dux, Jacques Dumesnil — Pleasing French entry — 88m.

SHOE-SHINE — Rinaldo Smordoni, Franco Interlenghi, Aniello Mele—Good Italian import—92m.

SHOP-GIRLS OF PARIS—Michel Simon, Albert Prejean, Blanchette Brunoy—Interesting French entry—88m.

STAR WITHOUT LIGHT—Mila Parley, Marcel Herrand, Edith Piaf—Good French drama—83m.

THUNDER IN THE HILLS—J. Prucha, J. Kacer, V. Nasova—High rating Czechoslovkian war drama—80m.

THURSDAY'S CHILD — Sally Ann Howes, Wilfrid Lawson, Stewart Granger—British import for the lower half—80m.

TORMENT—Stig Jarrell, Alf Kjellin, Mai Zetterling—High-rating Swedish psychological drama—91m.

TWINS—Mikhail Zharov, Ludmila Tselikovskaya, Vera Orlova—Fair Russian import—80m.

TWO ANONYMOUS LETTERS—Clara Calamai, Andrea Checchi, Otello Toso —Well-made Italian entry—90m.

VOW, THE—Mikhail Gelovani, S. Chiatsintova, N. Bogoliubov—Good Russian import—103m.

WE LIVED THROUGH BUCHENWALD—Rene Herde, Andre Gevrey, Werber Degan—Begian import is fair attraction for specialty houses—73½m.

WELL DIGGER'S DAUGHTER, THE—Raimu, Fernandel, Josette Day—Excellent French entry—120m.

YANK IN ROME, A—Valentina Cortese, Leo Dale, Adolpho Celi—Good Italian entry—105m.

ZERO FOR CONDUCT—Jean Daste, Robert Le Flon, Du Veron—Minor French art entry—44m.

TYPICAL OF THE ADVERTISING being currently used in New York for the announcement are these one- and two-column layouts shown here. Note the absence, in most cases—mainly, however, due to the lack of space—of what might be termed pure ballyhoo. Instead, emphasis is placed on the title of the picture and the theatre name, with address, star name, or quote when space in available.



CONCLUSION

In conclusion, for this specialized type of operation, it is necessary to ascertain in advance: (1) Are a sufficient number of people in your city interested? (2) Have you access to proper mailing lists, that is, those patronizing the opera, the ballet, the orchestra, the little legitimate theatre enterprises, and the like; schools, foreign groups, others? (3) Does the advance sale response to your subscription sale warrant your going ahead with the project? (4) Can you set all your dates with the legitimate theatre you are going to use in advance? Or, if you are going to convert your own theatre, can it be put in proper order for the policy switch, or partial policy switch? (5) Have you made sure of product availability for the entire series before starting sales, thus eliminating possibilities of substitutions of programs? (6) Are you among the minority who believe it would work, as there is no sense in trying something you yourself do not believe in?

If you can check and double check all of the above, then the film festival on a subscription basis is worth a try.

The Motion Picture in Veterans Hospitals

Use of 8-, 16-, and 35-mm. Screen Subjects Offers Entertainment, Aids Rehabilitation

EDWARD J. KELLY

Chief of the Motion Picture Division, Veterans Administration

There is in the United States a nationwide chain of theatres that packs in an audience of a million movie-goers a month; yet it uses hardly any promotional material, and much less than the accepted number of brilliant bulbs and marquees. And—no admission is charged.

The audience is composed of hospitalized veterans of the U. S. Armed Forces. The chain consists of 126 hospital theatres in which films are presented by the Motion Picture Division of the Veterans Administration, operating under the Recreation Services of Special Services.

A little over a year ago, in August, 1946, Veterans Administration put into operation a stepped-up motion-picture program that brings into Veterans Administration stations, to the hospitalized heroes of America's wars, an annual minimum of 156 first-run 35-mm. theatrical programs, including current newsreels and short subjects, and a minimum of 104 first-run features, 52 newsreels and short subjects in 16-mm. films.

The new 35-mm. program, after months of preparation, went into effect August 1, 1946. Prior to that date, contracts with distributors provided generally for very late runs and a limited number of features.

The new 16-mm. program went into effect September 15, 1946. Prior to that date only 18 hospitals were in a position to use 16-mm. films. These hospitals could get two features weekly, usually 5 to 8 years old, the product of four producers. As a result, bed-ridden patients—the more severe cases who could not make their way to the hospital's 35-mm. theatre — were deprived of current films, if they saw any at all.

To the average American who visits his neighborhood theatre weekly or oftener, a person who has not seen a movie in years seems to be missing a normal part of life. How much, then,

THEATRES in which 35-mm. films are shown are usually full-scale auditoriums (such as this theatre at the Deshon Veterans Hospital in Butler, Pennsylvania), suitable for various forms of recreation and entertainment, and equipped with standard projection and sound equipment maintained under contract with a national service company. Construction of ramps has enabled paraplegic wheel-chair patients, formerly unable to see 35-mm. shows, to wheel themselves directly to specially reserved sections. One hundred thirty-seven sets of 35-mm. equipment were operated last year.





SMALL PORTABLE PROJECTORS sometimes furnish entertainment in the ward, as (above) at a VA hospital in Dallas, Texas. Here instead of conventional sound system, the outfit is equipped with earphones so that other patients are not disturbed. Other times films are shown to a whole ward (middle), as at a facility at Topeka, Kansas. Here the projection is from a 16-mm. machine with its special attendant.



OUTDOOR SHOWS are given at a Veterans hospital in Dallas, Texas, on balmy nights (below). While chairs are provided, most of the spectators are wheel-chair patients. In this case, projectors are 16-mm. Ampro jobs, equipped with carbon-arc projection arc lamps. Films for these programs are carefully selected and, while used mainly for entertainment, also help to foster a patient's desire to get well.



was being missed by the many patients who, in addition, drew their life's breath from an oxygen bottle or who had to experience the discomfort of lying flat on their backs 24 hours a day, with a plaster cast encircling their bodies the full length of their spines? Up until the time the new Veterans Administration motion-picture program went into effect, many patients had not seen a film in two, three, five, or more years.

A World War I corporal at the Fargo, North Dakota, hospital saw his first sound picture while the industry was celebrating the 20th anniversary of sound last fall.

METHOD OF OPERATION

Under the new program there is available to both ambulant and bed patients new releases from practically every producer equipped for national distribution.

Executive Director

Veterans Administration's Motion Picture Division makes available each week a minimum of three current 35-mm. entertainment programs for a 45-day national play off at all hospital theatres, two current 16-mm. features, and current 16-mm. news and short subject programs for 120-day play. There are also on circuit each week in Puerto Rico five American films with Spanish dialogue or titles.

The Motion Picture Division at Veterans Administration's Central Office in Washington establishes national policy, secures contracts on a flat rental basis, estimates financial requirements, and, through an office in New York, screens new films and makes the best available.

Screening is regulated under a Board of Motion Picture Review, which considers not only the entertainment value of films, but also their medical effect on patients. Consultation with medical authorities is available to the Previewing and Booking Director in New York if he has any doubt of the acceptability of a motion picture.

Branch offices of the Veterans Administration are located in thirteen cities. Each branch office has a Chief of Motion Pictures whose duties include scheduling films for assigned hospitals through local film exchanges; arranging transportation, run, and circuits; maintaining contact with exchanges; and supervising the execution of policy.

The motion-picture program in Veterans Administration, Central Office, operates as a division of the Recreation Services of Special Services. Special Services is established under the jurisdiction of F. R. Kerr, Assistant Administrator. The Recreation Service is under the direction of Charles K. Brightbill.

Projectionists

At hospitals, trained projectionists operate 35-mm. equipment. In 16-mm. exhibition, projectionists are assisted by volunteers from public spirited organizations. The value of this effort by trained volunteer projectionists is evidenced in the estimate made at one hospital, Alexandria, Louisiana, that there would be 200 less showings per month without the help of volunteers.

Patients, too, are trained to operate 16-mm. equipment, either as a result of their own desire or a doctor's suggestion.

Sixteen-millimeter projectionists also assist other services at hospitals by showing films that are medical, nursing, dietetic or training in subject matter.

FACILITIES, EQUIPMENT

For 35-mm. Films

Theatres in which 35-mm. films are shown are usually full scale auditoriums suitable for various forms of recreation and entertainment and equipped with standard projection and sound equipment, maintained under contract with a national equipment service company. Some Veterans Administration stations are sufficiently large to warrant the use of two or three theatres. In the fall of 1947, there were 137 sets of 35-mm. equipment in operation at Veterans Administration hospitals and centers, bringing film entertainment to Veterans Administration patients.

The construction of ramps in hospitals has enabled paraplegic wheelchair patients, formerly unable to see 35-mm. shows, to wheel themselves directly into specially reserved sections of the theatres.

For 16-mm. Films

Sixteen-millimeter equipment and exhibition are more diversified. Although a few Veterans Administration stations are too small to require theatrical equipment and, as a result 16-mm. shows are given in recreation halls, the usual use of the portable equipment is to furnish motion pictures to bed-ridden patients incapable of attending group showings.

Considerable experimentation has been made, and is continuing, to effect the best use of movies in wards and small rooms.

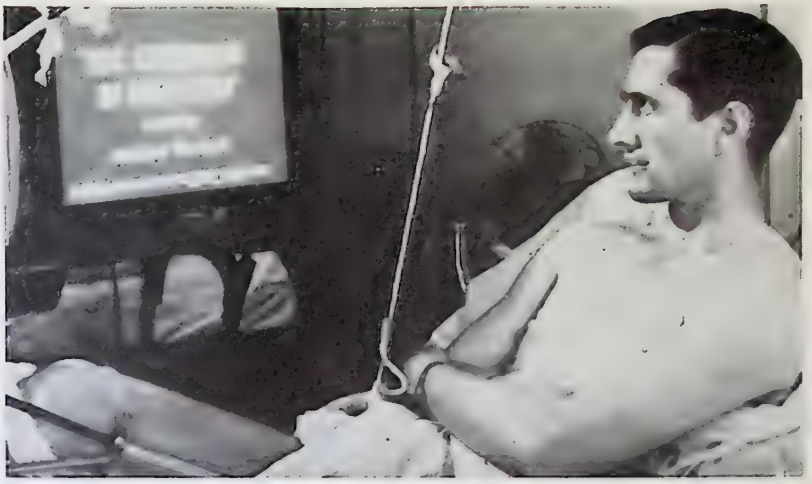
In this connection, cabinet type equipment has proven successful on a limited scale. The need for distracting a whole ward, and stretching electric wires the length of the room, is eliminated. This type of equipment reaches its highest value in showings of current newsreels and a few short subjects in private or semi-private rooms to seriously ill patients.

Compact, midget sized 16-mm. equipment has found practical use in Veterans Administration hospitals. This equipment can be rolled to the open end of a room, and a program presented. For bed patients, this type of equipment has provided ceiling and wall projection simultaneously.

Improvisation

Improvisation and experimentation were the rule when the stepped-up 16-mm. program first went into effect, September 15, 1946. In wards of paralyzed patients, unable to be moved, the image was flashed first on one side of the room, then on the other. Because of the completely horizontal position of many spectators, a point very close to the ceiling had to be used for focusing. Even patients who could see only directly above did not defeat the ingenuity of orderlies and projectionists who arranged Rube Goldberg contrivances of mirrors so that such patients could see the opposite wall.

Similarly projectionist H. E. Moore, at Legion, Texas, by removing the top of cabinet type projectors, flashes the film image on the ceiling for bed-ridden patients.



BED PATIENTS are not forgotten, and a variety of equipment—and much of it specially devised for its particular job—is used. The non-ambulant patient in the top picture watches the start of a feature projected from the back of the screen by an Ampro 16-mm. machine. In the middle picture a Bell and Howell Filmosound machine is being readied for a show at the Mount Alto Hospital in Washington.



ANOTHER BED-RIDDEN PATIENT in the Veterans Administration Hospital at Dallas, Texas, is not deprived of his motion-picture entertainment. In this case (bottom), the pictures are brought directly to the patient's bedside with a Mills Sono-Vision machine. The use of motion pictures for begetting and promoting a desire to live and to get well is one of the major elements of the film programs.





PERHAPS EXTREME, but not unique, is the case of Alfred Kohn, paralytic World War I veteran, bedridden since 1920, saw his first talking picture—"The Spanish Main"—from his bed at the Veterans hospital in Fargo, North Dakota, when the new Administration program went into effect. Here the daily routine of the hospital includes the showing of current motion-picture features in the wards.

MOTION PICTURE DIVISION

Central Office, Washington, D. C.

Chief ..... **Edward J. Kelly**
Motion Picture Technician ..... **Gladys N. Wells**

New York Branch of Central Office, 982 Eighth Avenue

Previewing and Booking Director ..... **William J. Jones, Jr.**
Asst. Previewing and Booking Director ..... **Victor Wallace**

Branch Offices

Location	Chief	Address	35-mm Commercial Film Exchanges
1—Boston	James J. Rahilly,	55 Tremont St.	Boston, New Haven
2—New York	Frank De Scipio,	346 Broadway	New York, Albany, Buffalo, Puerto Rico
3—Philadelphia	Richard L. Brown,	5000 Wissahickon Ave.	Philadelphia, Pittsburgh
4—Richmond	Russell W. Mengel,	900 N. Lombardy	Washington, Charlotte
5—Atlanta	S. Frances Keller,	Atlanta 3, Ga.	Atlanta, Jacksonville
6—Columbus	Cecil M. Sansbury,	52 S. Starling St.	Cleveland, Detroit, Cincinnati
7—Chicago	Chas. A. Murdaugh,	226 W. Jackson Blvd.	Chicago
8—St. Paul	George Barton,	Fort Snelling	Minneapolis
9—St. Louis	Ralph H. Plumb,	420 Locust St.	St. Louis, Kansas City
10—Dallas	Frank M. Shrader,	1114 Commerce St.	Dallas, New Orleans
11—Seattle	Lawrence L. Brennan,	821 Second Ave.	Seattle
12—San Francisco	Lucien C. Harrison,	180 New Montgomery St.	San Francisco, Los Angeles
13—Denver	Gerald C. Williams,	Denver Fed. Cen., P.O. Box 1260	Salt Lake City

Carl A. Fisher, radio and theatre program director at Crile Veterans Administration Hospital, Cleveland, Ohio, perfected a shadow box arrangement which permits film exhibition in undarkened rooms at any hour of the day. This arrangement proved practical and was favorably received by the Medical Service.

Earphones

The use of earphones with cabinet projectors, midget equipment, or standard equipment is a further boon toward bringing the most personal motion picture pleasure to individuals or small groups of bed patients without distrubing others in the same room or ward. In some hospitals commercially produced earphones are used, in others the sound is channelled through public address headsets, and in still others, projectionists have constructed very adequate earphone receivers. At the Hot Springs, South Dakota, hospital, projectionists E. L. Beck and R. B. Weisser designed and built headphone adapters which won the endorsement of doctors in the form of permitting a greater number of showings in wards. Diagrams of these adapters developed at Hot Springs were distributed to all VA branch offices for national use where desired. Marshall E. Bryarly, a Veterans Administration employee at Roanoke, Virgina, also developed practical, portable, individual sound equipment for bed patients. The use of such headset with as many as nine sets of earphones has been very successful.

Diagrams of practical projector carts were distributed nationally for convenience in "putting the show on the road" between wards and rooms.

Generally, showings take place indoors. However, there are one or two 35-mm. installations and many successful 16-mm. group showings outdoors, particularly in the summer season in the warmer regions of the country.

Mobile units are in use for film circuiting in Puerto Rico.

For 8-mm. Films

Eight-millimeter films have played an unusually helpful role at two hospitals, Rutland Heights, Massachusetts, and Montgomery, Alabama. Volunteers have made 8-mm. films of the homes and families of patients incapable of leaving the hospital. This very much appreciated service has brought a family reunion within arm's reach of patients since outright possession of the film is donated.

EVALUATION

Medical authorities have given many favorable opinions on the results apparent from the current motion picture program in Veterans Administration hospitals. In spite of such favorable reactions, serious care must be taken in screening out medically undesirable films, especially during Hollywood's "psychiatric cycle." Nor do these opinions lessen the need for close coordination of film showings and clearance of patients with medical authorities so as to prevent hindering, rather than helping the Veterans Administration medical service—a service which has achieved the goal of being a medical service second to none. There can be no claim that movies cure

veteran patients, but films can serve to reinforce the work of medical authorities, to strengthen the patient's will to get well, to keep him interested in normal activities, and to make life in a Veterans Administration hospital a bit more like life outside and at home.

The social effect of films on some mental patients is discussed in a report from a Massachusetts hospital (Framingham) concerning closed-ward patients:

"When the program first started some of the patients were hesitant about going and remained back in the ward. Now when we go to escort them over, the majority are waiting and are not at all hesitant about attending the show. They show a keen interest in who is featured and so forth. The two or three hours absence from a closed ward certainly is beneficial and does stimulate interest in something besides themselves."

In addition to this work, assistance was given medical authorities experimenting with a new type of diet for closed-ward patients. A diversified recreation program was desired during this experiment, including intensive use of films, which, according to medical authorities, play an important part in keeping up the morale of patients with mental disorders.

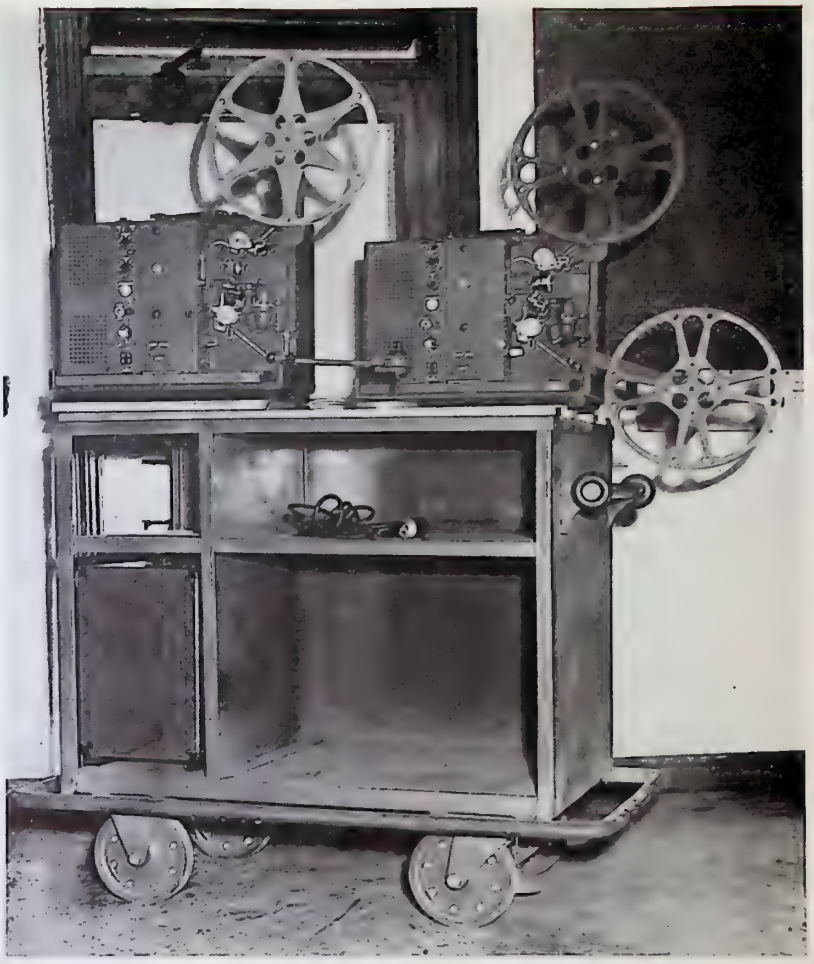
Some Cases

At The Bronx, New York, the chief of the chest section wrote, "Since regular showing of 16-mm. films was instituted in this ward, there has been a marked improvement in the morale of patients. It has assisted us materially, too, insofar as we can maintain better discipline since patients do not attempt surreptitiously to attend auditorium shows. They no longer feel that, as TB patients, they are missing out on regular full-length feature films."

In the absence of the regular projectionist at the Saratoga Springs, New York, hospital, the hospital manager pitched in to operate the 16-mm. equipment so that patients would not be deprived of the scheduled program.

At Salt Lake City, one veteran, hospitalized after an explosion and virtually immobilized, was in such agony that doctors felt a movie would be the only thing to take his mind off his pain. As many 16-mm. films were shown him as time permitted until he was well on the way to recovery.

At Jefferson Barracks, Missouri, a physician on a general medical ward phoned the recreation office about a veteran paralyzed except for a slight movement in his right hand. He would die soon. There was nothing medical science could do for him. It was desirable to have Recreation personnel come in and give him something to keep his mind free. The boy was lying flat on his back, staring at the ceiling. It was difficult to find something to ease his mind. He agreed to have someone read to him and this was done daily. After further visits he expressed an interest in seeing motion pictures and special 16-mm. showings were arranged. In addition, the projectionist installed a finger-snap device to enable the patient to turn his radio on and off. These were small and inadequate things to do for a boy doomed to die. However, the pleasure he gained speaks well for the part recreation and film activities can play in a hospital.





TYPICAL OF THE EQUIPMENT used in the Veterans Administration motion-picture program are the items shown in these two pictures. Above is a cart developed for the special purpose at the hospital in Alexandria, Louisiana. Below shows a few of the different types of 16-mm. projectors used in the Administration's branch office in Dallas, Texas. Arc-lamp projectors are included in the equipment.

A Center for Shopping, Amusements, Sports

Regular and Drive-In Theatres Are Combined With an Arena, Stores, and Hotel Facilities

E. C. A. Bullock
Architect

The community shopping, amusement, and sports center illustrated in the accompanying sketches is to be located on a main highway and in close proximity to a college town which has, during and since the war, increased in size and population to such an extent that the old business district is entirely inadequate. As new residential developments, both real and proposed, surround the proposed site, it is felt that the shopping center portion of this scheme will fill a definite need and will relieve congestion of parking, and so forth, in the present business district. Extensive parking facilities have been provided for customers of the shops and stores, all of which will be connected by a covered arcade. Facilities for a gasoline and service station have also been provided, which will enable cars to be serviced while the customer is shopping. This will be an advantage to both the service station and the shop owners, and also to the customer.

Connected with the shop arcade will be a 1,000-seat movie theatre, which is needed in this community and will draw trade to the shops and vice-versa. The parking space provided, primarily for the shops in the daytime, will also be a great advantage to the theatre at night. The inclusion of a theatre in the scheme is particularly advantageous, making the whole center both a daytime and nighttime operation and providing light and life, which cannot but help draw trade to any of the shops remaining open during and after theatre hours.

The 750-car drive-in theatre is not, at the present, a definite part of the scheme, but has been shown to illustrate how it could be combined, for future consideration. At first glance, it would appear that the drive-in theatre would offer direct and serious competition to the regular theatre patronage. However, it is felt that when this development is started, a competitive drive-in theatre will be attracted to the vicinity and therefore facilities for the drive-in should be incorporated for protection. As a matter of fact, there is no reason why both types of theatres could not be made to pay if properly exploited and conducted by combining overhead expenses, etc.

The sports arena has been included in the scheme due to the fact that it is located near a large and growing college from which considerable income can be assured for its use for basketball, ice hockey, fraternity dances, and the like. It is also planned to make this the home of a league hockey team, and to use the arena's facilities on open nights for public ice skating, dancing and so forth. Provisions for restaurants and concessions have been provided, and also provisions have been worked out for movable dividing partitions, so that more than one function can be accommodated at one time, and also to provide for the necessity of only keeping a portion of the ice rink frozen, when used only for public skating.

In the basement will be installed sixteen bowling alleys, which will provide for a constant and sure revenue for this particular unit.

On the opposite side of the shopping center, it is proposed to erect a modern hotel, with cottages for automobile tourist trade to be run in conjunction with the hotel operation. The location is close enough to the town and the college to make it convenient for the regular hotel guests and regular bus service is already available and will be augmented.

The varied social, scholastic, and athletic activities of the college will provide the hotel's clientele, and the main highway running past the site will provide customers for the cottages, which will be of advanced design, solidly built, attractively furnished, each with a private garage, and will be arranged in suites, doubles and singles, and will be provided with the same type and class of service as a first-class hotel. Private baths for each will be provided, heating for year round use, and some will be provided with small kitchenettes for use of vacationists who might wish to spend their vacation in this delightful community, which has mountains, woods, and many other natural attractions.

The heating, air conditioning, and other mechanical facilities required for the entire development will be located in a central plant, resulting in a saving of initial cost of construction and equipment, and in a definite saving in fuel and labor for the actual operation of these facilities.

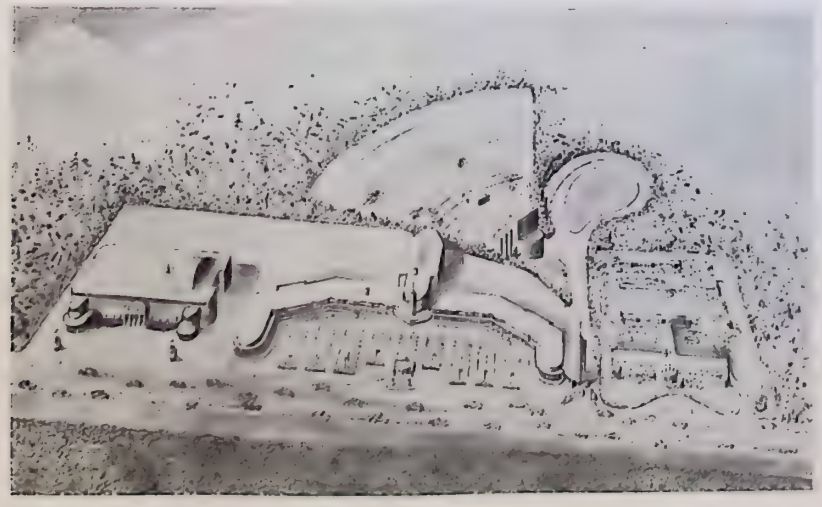
It is also planned to have all units—including the shopping center, the theatre, the sports arena, the hotel, and the cottages—under one management, which will provide for a uniformity in operation.

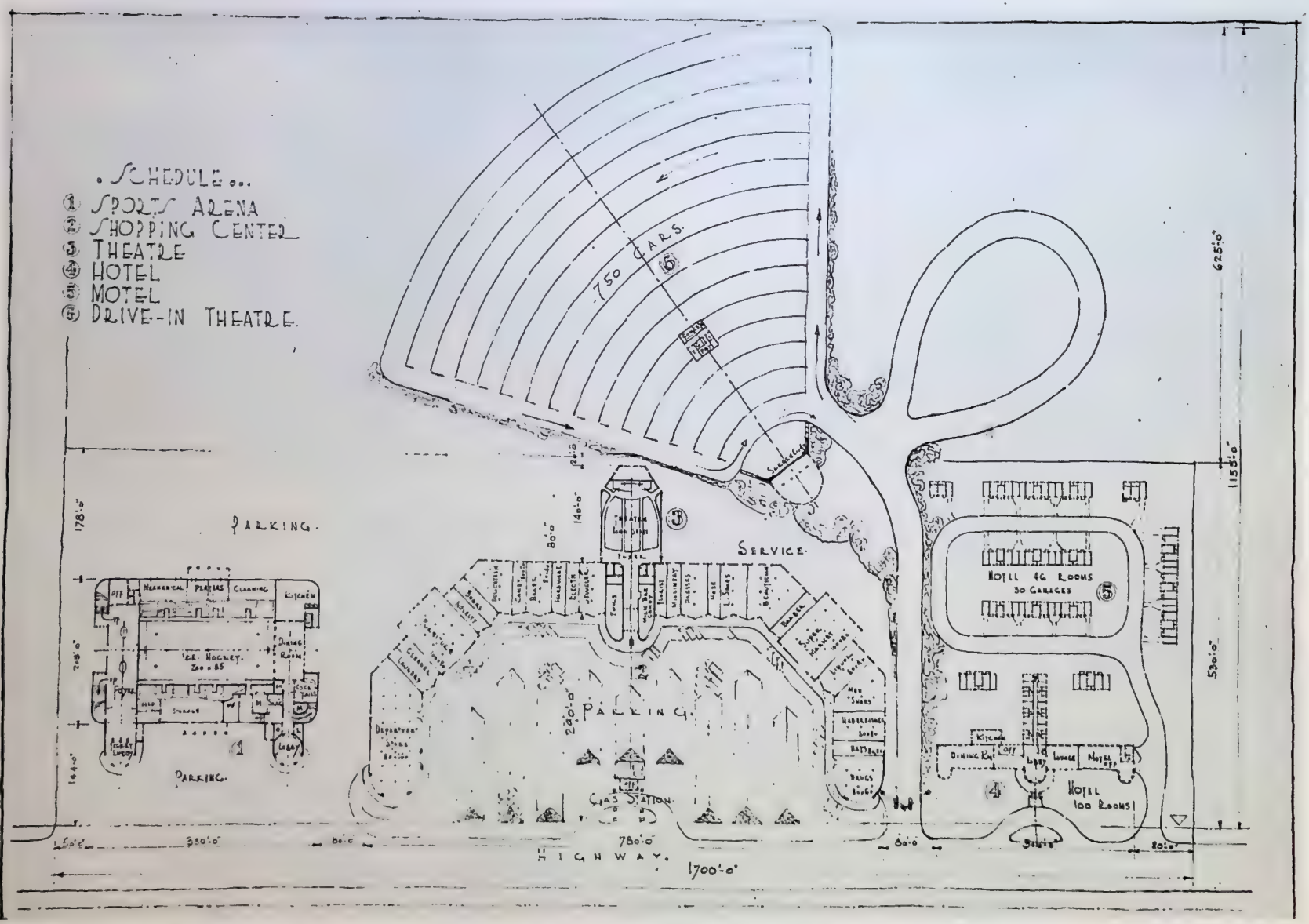
In this connection it is felt that each unit, although a distinct operation, will be of a monetary advantage to each of the others. As an example, the shops will draw customers to the theatre and both shops and theatre will draw trade from the guests of the hotel and cottages. The same is more or less true of the sports arena. This arrangement will draw a better class of shops, stores, and restaurants, than would be the case if only one or two of the units were proposed.

The extent of the layout with pleasing and related architectural design for all units, a comprehensive landscaping treatment, and the constant activity resulting from the varied types of operation will in itself be a drawing card not only to local residents and students, but also to passing motorists, and residents of outlying small communities who do not have advantages which this development will present.

Although the property at the proposed location is relatively cheap, the value of the surrounding property is sure to be greatly enhanced, as soon as construction is started, and the sale of restricted residential plots is expected to materially affect the financing of the development.

A PROPOSED COMMUNITY CENTER includes (1) a sports arena, (2) a shopping center, (3) a 1,000-seat theatre, (4) a 100-room hotel, (5) a 46-room, 30-garage motel, and (6) a 750-car drive-in theatre. The development is planned for a fast-growing college town where all the included facilities could, without stretching the imagination, be conceived to be in demand through the year, even during the summer.





PROPOSED LAYOUT for a community center designed to have everything and to have it for year-'round operation is here presented, to show the relation of the various elements of the project, presented in perspective sketch in the other illustration. Like many another college and college town, the post-war influx of students has created a critical situation, not only as to housing, but to all other activities as well—even to the extra curricular activities of the college. Here, in such a development as this, is one solution, where the college benefits no less than the community at large. A further advantage of the development is that it automatically becomes the nucleus around which a residential development can be promoted, as well as being the center of operations for many visitors to the college.

Restaurants in Association with Theatres

Realization of the Most from Extra Profits Should Include Possibility of Food Service

S. Charles Lee
Architect

Since the sale of popcorn and candy has proven so financially successful in theatre operations, it is only natural that the mind of the operator turn its attention to realizing the most from concession operations. While sheet music, records, toys, and other items have appeared from time to time in the theatre concession set-up, it seems that at the present time the best public acceptance is in the confection and food items.

Food service in connection with motion-picture theatres is not a new feature in Mexico. This developed faster in Mexico than it has in the United States chiefly because their shows used to start shortly after siesta time in the late afternoon and a great deal of food was consumed in the theatres. We consequently developed complete rooms handling food, which led to many problems from the technical side.

First of all, the room where food is served must be located so as to be architecturally attractive, tie in with the general theatre plan, be in a convenient location, designed so that crowds can be handled in and out with a minimum of interference, plus the multiple complications of odors from cooking and coffee being warmed, preparation of cooked meats for sandwiches prepared on the premises, and the handling of dish washing both from the standpoint of convenience and the appearance to the patrons.

From the standpoint of handling food in the United States, probably the best and latest example is the new Miami Theatre on Flagler Street, Miami, Florida. This is the No. 1 shopping district and the most important shopping street. The theatre has a "grind" policy and food and confectionery are handled by expert operators. To start with, a lease was made with Huyler's large chain operators from New York, to occupy the space to the left of the theatre entrance and all of the second floor.

The front was designed as though the theatre occupied the entire building, giving an imposing and theatrical mass to the face of the building. The lower floor has a marquee directing the flow of traffic to the entrance without obstructing the adjoining shop occupied by the restaurant and confectionery.

This first floor has a standard confectionery layout on the Huyler's side, opening into the theatre foyer, and also entered from either the lobby or the street. Complete fountain service as well as confectionery is operated. This same type of operation both inside the Huyler's store and in the theatre has been repeated at the mezzanine floor level by designing the mezzanine level and the second floor confectionery store on the same level. Therefore, standee crowds can be served on the theatre side either from the foyer or the mezzanine level; and access is also provided to the mezzanine confectionery level through doors from the theatre mezzanine itself.

While the operation may seem complicated in story form, it is actually very simple and efficient and the theatre delivers a high quality of merchandise, dispensed by experienced confectionery help.

The handling of foods in both levels of the Miami Theatre is accomplished through the main kitchen being located in the basement and dumbwaiter lifts serving both floors. Secondary warming kitchens are operated on both levels.

Architecturally the space should be beautifully handled so that the theatre will benefit from the confectionery operation of the building and vice versa. Many persons have taken advantage of the waiting period by using the confectionery operation of the building. This is increasing the possibility of holding the crowd together waiting for show breaks with profit to both the concession and the theatre.

THE SODA FOUNTAIN of the Lido Theatre, Mexico City, is at the right. The foyer is done in dusty shell pink, with light fixtures of hammered brass by native craftsmen. Food sales rank high in theatres and special rooms have been developed through solving the many technical problems.



THE MEZZANINE SODA FOUNTAIN of the Chapultepec Theatre, Mexico City, has a back wall of gold Flexglas, with inserts of gun metal Flexglas. The general side walls of the mezzanine area are faced with Flexwood. In Mexico, restaurants have proved popular since shows start after siesta time.





THE MIAMI THEATRE, Miami, Florida, is probably the latest and best from the standpoint of handling food. The exterior (top) shows the integral design of Huyler's sweets shop and the theatre. The overhead shot of the store (center) shows the island candy counters arranged in a hollow square.



LOOKING FROM THE FOYER toward the street (top), the entrance to Huyler's is clearly shown. Flanking the all-glass, full-length doors are plate-glass panels which further add to the expansiveness of the area. The drink bar in the foyer (center) is readily available to all the patrons.



A DIRECT ENTRANCE from the Miami's lobby to Huyler's (center) is made through full-length glass doors. A part of the Huyler's restaurant (bottom) shows the serving counter. Similar candy and restaurant facilities are on both the foyer and the mezzanine floors of this most recent Wometco theatre.



ON THE MEZZANINE is another drink bar (bottom). Both drink bars tie into the restaurant facilities of the Huyler's part of the project. For further details, see the pictorial presentation in the photolithographic section. Architect for this theatre-restaurant project was S. Charles Lee.





Billiard Parlors with Theatre Enterprises

In Mutual Ventures, Extra Profits Derived From the Usually Forgotten Basement Space

H. B. MacCready
The Brunswick-Balke-Collender Company

Planners of theatre projects and recreational facilities are fast realizing the extraordinary public appeal and additional profits for their investment in new "double threat" theatre-billiard room combinations. These modern motion-picture theatres of the much-discussed post-war era are comprised of a motion-picture plant of the most advanced type and a billiard parlor of extraordinary public appeal which is located in the usually forgotten basement space of the building.

RECENT VENTURES

The principal element of the new plant is, of course, the theatre portion. But beneath the theatre there is the modern billiard room which is an extra income-bearing element which undoubtedly deserves priority in the description because of its rather remarkable record of earnings, which average around 17½ percent in volume to the dollar of daily income.

Twelve to twenty billiard tables of the sophisticated type usually occupy this basement area—the room being accessible from the street as well as from the lobby of the theatre proper.

Midwest's Billiard Parlor

An excellent example of this type of establishment is that of the Midwest Theatre of Scottsbluff, Nebraska. It was constructed and is operated by the Midwest Amusement and Realty Company of Scottsbluff and is headed by W. H. Ostenberg, III, as managing director.

The Midwest billiard parlor, construction and equipment, which cost approximately $23,000, has it own confectionery and refreshment room, as well as other provisions for the comfort and convenience of the customers, most of whom are before-or-after patrons of the theatre portion.

This room is equipped with twelve Brunswick Commander Model V tables, which include nine 5 x 10 snooker tables, one 5 x 10 carom table, and two 4½ x 9 pocket billiard tables. Fluorescent tube lighting in specially designed fixtures illuminates the tables, and the parlor has its own heating and air-conditioning system. The floor of the billiard room is covered with asphalt tile which is also used for the wainscot. It is theatrical in atmosphere and easily accessible either through a massive aluminum door opening off the street level or from the stairway in the lobby which leads to the billiard room below. The architect has carefully adhered to the fundamental objective to achieve interior designs that

THE BILLIARD PARLOR in the basement of the Midwest Theatre, in Scottsbluff, Nebraska, is equipped with twelve Brunswick Commander Model V tables, which include nine snooker tables, carom tables, and one pocket billiards table. Fluorescent tube lighting in specially designed fixtures illuminates the tables, and the parlor has its own heating and air-conditioning system. It has its own confectionery and refreshment room, as well as other provisions for the comfort and convenience of the customers, most of whom are before-or-after patrons of the theatre. Cost was about $23,000.





ENTRANCE to the Midwest Theatre's billiard parlor is at the far end of the front. In the billiard room, the floor is covered with asphalt tile, which is also used for the wainscot. It is theatrical in atmosphere and easily accessible. The architect has carefully adhered to the fundamental objective to achieve interior designs that do not subordinate the functional problems involved. Here, lighting, air-, and sound-conditioning are parts of the whole conception, and it is along these lines that the development of this theatre-billiard room was planned, built and equipment installed.

do not subordinate the functional problems involved. Here, for example, lighting, air and sound conditioning are parts of the whole conception and it is along these lines that the development of this theatre-billiard room was planned, built, and installed.

Melrose's Billiard Lounge

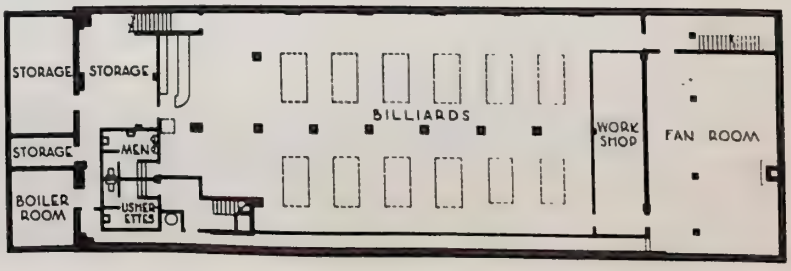
Another example of how profitable this new type of combination theatre and billiard business can be is that of the Melrose Theatre and Billiard Lounge of Nashville, Tennessee, whose owner, James H. Vester, states that "this billiard parlor in the basement of the Melrose Theatre is a profitable, self-supporting attraction" and that he feels that if others who are going to build theatres will give some thought to the use of the basement, they, too, can profit by the same situation that he has developed.

The Cue and Cushion

The Cue and Cushion, which opened in Springfield, Illinois, in the fall of 1947 and is sponsored by the Brunswick-Balke-Collendar Company, the 103-year-old manufacturers of bowling and billiard equipment and supplies, is an example of integrated effort to make the ancient game of billiards, which fell into disrepute during the early part of the century, a thoroughly "wholesome and respectable" sport which can be enjoyed by the entire family, father, mother, daughter, and son, alike. This modernistic, streamlined billiard room is a bright, tube-lighted, air-conditioned, sleekly streamlined neighborhood resort where the whole family can enjoy their leisure hours in the mild and healthful exercise of billiards. The Cue and Cushion is making a special effort to prove that the game of billiards is by no means for men only and that women, girls and the younger generation of the male sex, can find highly interesting sport and relaxation in the wielding of the cue and the mastery of pocket billiards and three-cushion billiards, as well as the many variations of both games.

Women, who have established beachheads in practically all other sports, such as golf, swimming, softball and bowling, are expected to be among the more regular patrons of the Cue and Cushion. The sport of billiards, with its many games, always has been attractive to women. It appeals to them because it is a sport of skill rather than a pastime which requires brawn. Co-eds at universities throughout America have been competing in billiards since 1940, when Charles C. Peterson, world's fancy shot champion, introduced his co-ed system of key-shot billiards. This key-shot system of billiards has already been played by the male students since it was introduced at the University of Wisconsin in 1931. Boys' clubs have also been competing in national billiard tournaments and in 1947 over 5,000 boys between the ages of nine and twenty years

BASEMENT PLAN of the Midwest Theatre shows the layout of the billiard parlor, without curtailing the house facilities of the theatre itself. A long corridor connects the fan room with the boiler room and storage spaces at the front of the building. The workshop is so arranged that its facilities can be used by both the theatre and the billiard parlor. Charles D. Strong was the architect.



entered these wholesome contests. It is estimated that contestants for the 1948 tournament will more than double this number.

PLANS, INSTALLATION

Edgar Lynch, architect and director of the Brunswick - Balke - Collender Company's architectural research department, is responsible for the design and plans for the Cue and Cushion. Lynch, who has been in practice since 1929, interrupted a noteworthy career as architect and consultant to outstanding Chicago and New York business and realty firms to collaborate with Donald Deskey Associates on the original concept of this modern billiard room. Lynch says, "We are happy to co-operate with others on plans and designs for the building, equipment, and design of modern streamlined billiard rooms. . . . We plan to offer a series of practical workable brochures designed to serve as springboards for the builder's own thinking, they will demonstrate a sound solution to various problems usually encountered in designing modern billiard recreation structures."

The Cue and Cushion, according to the architect's report, is an example of "functional planning for today's recreational needs." The room was planned in three parts: (1) the playing area, (2) the soda and lunch lounge, and (3) the service area.

The room offers fourteen playing tables. Eight of the tables are for pocket billiards; four are snooker tables; and two are carom tables. Pocket billiard tables predominate since this game is by far the most popular of the cue games.

Recreational Area

Lynch calls attention to the fact that in the recreational area great care was taken in locating and spacing the billiard tables to allow the maximum amount of player comfort. In studying this problem it was found that twenty tables could have been squeezed into this room using typical playing methods. In the developed plan only fourteen tables were used—thus giving the players maximum playing comfort. All tables have revolving cue racks conveniently located and special settees for both players and spectators. The floor in this area is a soft grey asphalt tile. The walls in the recreational area are striated plywood or Weldtex and are finished in a soft grey harmonious with the grey cloth that is used on the tables. The color on the walls, the settees and the floor was deliberately designed to create a restful background for the game of billiards. The walls are lighted by a recessed cove containing fluorescent lamps that cast a warm glow on the walls. The tables are lighted by recessed louvred incandescent fixtures carefully located after much experiment to cast an even, non-glaring flood on the table surface.

Lounge-Refreshment Area

The lounge refreshment area is elevated and thus segregated from the recreational area. It has a dropped acoustical ceiling and contains a row of cold cathode plus louvred lighting. The tables and chairs are especially designed where light lunches, sodas, and so forth are served, and from where one may watch the players. The soda fountain and food area are of a special and unique design. The floor in this area is white terrazzo with black diagonal stripe.

CONCLUSION

This new type of recreation center will serve as the pattern for billiard rooms of a similar type which are expected to spring up in all parts of the country; ultra-modern billiard centers which will bring to the cue sport the environment the game deserves as one of the nation's most popular pastimes.

Yes, it seems that plus profits can improve from mutual enterprises.

THE BILLIARD LOUNGE at the Melrose Theatre, Nashville, Tennessee, is another example of how profitable this combination can be. In this development, store space has been utilized instead of the normally unused portion beneath the auditorium. Here bowling alleys have been included in another portion of the structure. The owner, having found billiards "a profitable, self-supporting attraction," feels that others should give thought to the use of basements and extra space for the inclusion of such facilities. Indeed, more profits can accrue from these mutual enterprises.



EXTRA PROFITS

1947-48

$303,000,000 a Year — in Extra Profits

The 1947 Survey on Theatre Merchandising: Equipment, Products, and Expected Returns

$303,000,000 a year — and all extra, above and beyond the admissions paid! Yes, that astronomical figure — albeit small beside the $1,800,000,000 paid in actual admissions—represents the potential cash outlay of the patrons at nearly 18,000 theatres for popcorn, candy, gum, beverages, cigarettes, and other extra-profits items during the year 1947. And that is what it will be, on the assumption that the average 5,200 patrons each week* at each of the nearly 18,000 theatres selling extra-profits items will produce an annual buying clientele of 72,950,000 patrons each of whom will spend approximately 8 cents. And more precisely figured, it comes to $303,467,124.24! Yes, $303,000,000 is a tremendous sum, and one which, perchance, is beyond the expectations of the most sanguine booster of extra-profits merchandising in theatres.

For some time, sapient observers of the American mopes have noted the increase in the sales of non-cinematic entertainment in the nation's theatres, and they have opined that the gross must be somewhat on the "terrific" side. Yet, thus far, the extent of the business could be expressed only in qualitative terms, for no one—not even the manufacturers and wholesalers, let alone the theatres themselves—had facts and figures from which to elaborate a quantitative appraisal.

To obtain the facts of extra-profits life, accordingly, has become essential; but, for reasons which may or may not seem obvious, both theatres and theatre organizations, as well as manufacturers and wholesalers, seemed unwilling to take the logical step.

It, then, became incumbent upon the EXTRA PROFITS section of THE EXHIBITOR—the motion-picture trade paper first to appreciate the significance and importance of this business-within-a-business—to embark on a nation-wide fact-finding mission and present those facts and figures as they are, interpreted quite from without the sphere of influence of the profit motive, either from the standpoint of the theatre or the supplier.

To that end a survey form was prepared, designed to elicit such answers as the summations, percentages, and correlations should properly interpret the true state of affairs. That report is here offered to the service of theatres and the extra-profits industries.

THE SURVEY FORM

Preparation of questionnaires for surveys is an intricate and difficult business, for, unless one has made up this type of document, all the difficulties entailed in framing the questions—and the selection of the number and scope of the questions to be asked—cannot be wholly appreciated. The questions must not be long or complicated, or difficult of easy comprehension; yet the questions must be explicit and so framed as to permit of—so far as possible—but a single answer. Also certain "checking questions" with known answers must be included in order to evaluate properly the average nature of the eventual "package" obtained.

After many futile attempts to develop a form—which always seemed to go to at least two pages!—it was decided to adopt a form that should require only a check mark in the proper square or a sole figure on a particular line.

Eight questions were finally selected: two on the background of the reporting theatre, two on the type of operation, two on the displays used, and two on the net results of the business.

In the first place, it was desired to know whether the reporting theatre was first or subsequent run, and the number of shows a day that were run. And then it was desired to have information on whether the theatre was located in a main stem area or in one of more purely residential areas, and the number of seats.

In the merchandising field, it was first asked that the item on sale be indicated, with candy, popcorn, beverages, gum, cigarettes, magazines, star stills, records, song sheets, and "other," being listed for checking in the proper square. Then was asked the type of merchandising, whether by machine or by lobby stand or counter, and if the operation was by the theatre itself or leased as a concession. Whether the attendant received commission or bonus was asked on a yes-or-no basis.

As to the type of display, the theatre was asked to check whether it was an open stand or a closed counter, and whether it was serviced from the front or the rear. In connection with displays, it was deemed advisable, if possible, to obtain a statement of opinion as to the most preferred type of package, whether of cellophane, paper, cardboard, novelty box, or what.

As to the price range found most salable, the answerer was offered space to put the proper percentage figure for items retailing at 5, 10, 20, 25, and 50 cents, and $1 and over. Perhaps the most significant question of all was the last, "What is the number of lobby stand items sold, per 100 admissions?" and "At what average sales price per item?"

To insure cooperation and as a guarantee of good faith, it was pledged that "All replies will be retained in our offices and kept in strictest confidence; with only grand totals and percentages used."

While a gratifying number of theatres returned filled-out questionnaires — a percentage sufficient to assure the statistical accuracy of this report—a few returned blank forms and even there was passed on the dubious compliment that "A personal friend could not find out all about my business, let alone you"! However, the great majority responded with gratifying completeness, and not a few offered facts and figures definitely on the really confidential side.

In the tabulation of the data from the returns, a sectional breakdown was made, for it is well known that, for example, popcorn is only in recent years coming into the northeastern states, while candy has been a stock item there for years. That the present data may be applied against statistical reports of other organizations, it was decided to use the same sectional breakdown employed by the United States Department of Commerce's publication, "Regional Survey of Market for Confections," by George Dudik (Industrial Series, No. 64, 1946).

This breakdown of states is as follows:

Northeast—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Virginia, and West Virginia.

South—North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky, Tennessee, Louisiana, Arkansas, Oklahoma, and Texas.

North Central — Ohio, Michigan, Indiana, Illinois, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Wisconsin.

Mountain—Montana, Idaho, Wyoming, Nevada, Utah, Colorado, Arizona, and New Mexico.

Pacific—Washington, Oregon, and California.

In the government report just cited, frequent consolidation is made of the Mountain and Pacific areas, but in this present work, the five regions have been carried intact throughout. While much of the following discussion of the results may seem to emphasize the over-all national picture, the tabular will be presented sectionally—with a national total, percentage, or average — so that the

TABLE 1—Number and seating capacities of theatres in the United States (Film Daily Year Book, 1947) and population (World Almanac, 1947).

	Total Number of Theatres	Total Seating Capacity	Population
Northeast	4,969	3,952,964	43,307,364
South	4,981	2,338,482	34,335,314
North Central	6,199	3,485,713	40,143,332
Mountain	984	435,332	4,150,003
Pacific	1,632	1,181,169	9,733,262
U.S. TOTAL	18,765	11,393,660	131,669,275

*All figures and percentages pertaining to the over-all national exhibition situation are taken from the 1947 Film Daily Year Book. Figures germane to extra profits are those hereinafter set forth.

TABLE 2—Average seating capacity of United States theatres, with average number of potential patrons for each theatre and for each seat, based on the totals given in Table 1.

	Average Number Seats	Number of People to Each Theatre	Number of People to Each Seat
Northeast	796	8,715	11.0
South	469	6,893	14.7
North Central	562	6,476	11.2
Mountain	442	4,218	9.5
Pacific	724	5,964	8.3
U. S. TOTAL	607	7,016	11.6

reader may form his own detailed appraisal.

THE POTENTIAL MARKET

Before launching into a discussion of the results of the extra-profits questionnaire, let us look a bit at the potential market, from the standpoint of the actual number of theatres and seating capacities in the five areas into which the basic data has been broken down. And all, of course, must be considered from the standpoint of population.

Basing the calculation of theatres and seating capacities on the data from the 1947 Film Daily Year Book and the population figures (as the latest official figures) from the 1940 census, as carried in the World Almanac for 1947, we find, from Table 1, that there are 18,765 operating theatres in the United States, with 11,393,660 seats, to serve a population of 131,669,275. (The estimated population on January 1, 1946, was, however, 140,386,509, but this figure was not used because there was not available a state-by-state breakdown.)

Further statistical detail, culled from Table 2, shows that the average seating capacity is 607, and there are 7,016 potential customers for each theatre, and 11.6 patrons for each seat. It will be noted that, because the survey data is based on a number of theatres somewhat less than the grand total, the survey averages (compare Table 6) do not coincide with the national figures, but the order of the capacities in the five regions is the same.

While the present survey indicates an average seating capacity of 600 (compare Table 6), the national over-all figures, from Tables 1 and 2, result in an average of 607, attesting to representative nature of the sample from which the following data are taken. The substantiality of the basic report is further indicated that, while the 1947 Film Daily Year Book states that a given feature is presented 2½ times a day, the present compilation (Table 4) indicates that the number of shows (which may be considered as synonymous with feature screenings) is 2.8.

FACTS IN EXTRA PROFITS

In covering this extra-profits questionnaire and the data and conclusions from it, the general order of the questions will be followed, and the pertinent discussion continuing in the same section with the data.

The more general aspects of the survey will be reserved for the section, Management Notes. Here, too, will be presented the exhibitor consensus as it may be judged for comments written on the returned form, comments that throw a clear light on the whole situation but which can hardly be reduced to mathematical averages and percentages.

In interpreting the results set forth below, it must be remembered that the figures refer only to the theatres that are actually selling one or more extra-profits items, and does not necessarily reflect the situation that would obtain were the total of all the theatres—selling and non-selling—used as the base for calculations.

Type of Theatre

In the first two major questions of the extra-profits questionnaire, it was desired to obtain an idea whether or not such selling was identified with a particular point in an area's clearance schedule, with theatres offering a certain number of shows a day, with theatres in business or residential areas, and with theatres of certain seating capacities.

At the very outset in the tabulation of these data, the matter of definition came to the fore, as will be clearly seen from Table 3, where the returns are shown analysed as to whether the particular theatre is first or subsequent run.

The survey, being conducted by a motion-picture trade paper, employed the terms "first run" and "subsequent run" in more or less the distribution

TABLE 3—Percentages of theatres selling (94.4 percent of the grand total) and not selling (5.6 percent of the grand total) extra-profits items, classified as to first- and subsequent run.

	Theatres Selling		Theatres Not Selling	
	First Run	Sub Run	First Run	Sub Run
Northeast	40.8	59.2	17.5	82.5
South	77.0	23.0	80.0	20.0
North Central	65.8	34.2	66.7	33.3
Mountain	96.5	3.5	100.0	0.0
Pacific	51.7	48.3	33.3	66.7
U. S. TOTAL	60.4	39.6	47.3	52.7

sense, of theatres playing "out of the can" or subsequent thereto. The virtual 60:40 ratio, therefore, cannot be accepted in this restricted sense, and it is apparent from the write-in remarks that the theatres took a broader view.

Since distribution is not wholly based on such key-city first-runs, and each area—even cities themselves—has subterritorial clearance schedules, the term "first run in so-and-so" has come into being. Accordingly, the theatres, making the most of what chances they get to show their position of eminence, do, with understandable pride, think of themselves as first run.

Despite this conflict in interpretation of terms, there seems to be no clear-cut variance between extra-profits merchandising and the run a given theatre enjoys.

CANDY MACHINES, such as this pair in the Strand Theatre in Providence, Rhode Island, were the first extra profits equipment to be installed in theatres. With the advent of counters, their popularity has waned, but they still find service in more than 30 percent of the country's theatres, including some houses having attended counters. An eighth of the U. S. theatres have both sales means.



TABLE 4—Percentage of theatres, classified according to the number of shows offered each day

	1 Show	2 Shows	3 Shows	4 Shows	5 Shows	6 Shows	7 Shows	8 Shows	Aver.
Northeast	5.1	43.8	22.0	17.4	7.9	2.3	0	0	3.0
South	8.3	36.2	21.7	15.3	16.6	2.1	0	0	3.0
North Central	5.9	67.8	9.1	6.5	5.2	5.2	0.7	0.7	2.6
Mountain	9.6	52.6	14.3	0	19.5	0	4.8	0	2.9
Pacific	10.6	59.3	14.9	10.6	4.3	0	0	0	2.4
U. S. TOTAL	6.7	51.3	16.6	12.3	8.8	2.8	1.0	0.5	2.8

In the matter of the number of shows a day, Table 4 reveals that the reporting theatres show a nation-wide consistency in the number of shows presented each day.

From an inspection of Table 4, it would seem that continuous-performance theatres (six or more daily shows, on an all-day schedule) are in the minority, with but 4.3 percent. On the other hand, theatres offering one, two, or three shows a day amount to 73.5 percent, leaving but a little over 21 percent of the theatres doing more than afternoon and evening business but less than continuous.

Type of Patronage

As to the type of patronage of the reporting theatres, it is about a toss-up as to whether the theatre is on the main stem or in a more strictly residential area. The percentages are given in Table 5.

Just as there is a manifest tendency on the part of the theatres to consider themselves in the highest possible category in the clearance schedule, so is there an equal trend on the part of the cinemas to think of themselves as businesses in a business area.

Accordingly, the data offered in Table 5 probably reflect more wishful thinking than fact, providing one overlook the general zoning regulation which makes the place a theatre can be erected, ipso facto, a business area.

That the survey has covered the whole range of United States theatres, from the standpoint of size, is shown in Table 6, where the range of seating capacities, and the sectional averages, is given.

While nothing was asked regarding the type of show presented or the operational scheme of things, write-in comments indicated that the returns came from "ordinary" theatres, as well as those serving more restricted groups such as Negro, newsreel, art, and foreign-made clienteles.

It might also be added at this point that any returns from theatres operating only on week-ends or in certain seasons were set aside. While virtually all of these theatres would and did sell extra-profits merchandise, it was thought best to keep the survey on a year-'round basis, and consider the profits from seasonal operations as just so much extra extra profits.

TABLE 5—Percentage of selling (94.4 percent of the grand total) and not selling (5.6 percent of the grand total) extra-profits items, classified as to the source of patronage.

	Theatres Selling		Not Selling	
	Main Stem	Residential	Main Stem	Residential
Northeast	30.2	69.8	41.7	58.3
South	58.8	41.2	66.7	33.3
North Central	48.3	51.7	83.3	16.7
Mountain	66.7	33.3	40.0	60.0
Pacific	52.7	47.3	100.0	0.0
U. S. TOTAL	46.0	54.0	57.2	42.8

Type of Merchandise

Having shown the type of theatre covered in this extra-profits survey—that all types, sizes, and conditions of theatres are included—attention can be turned to the actual items purveyed to the public in the nation's houses devoted to motion-picture entertainment.

On the questionnaire provision was made to check off nine specific items—candy, popcorn, beverages, gum, cigarettes, magazines, star stills, records, and song sheets—with a tenth space for "other", the names of which were to be written in.

That no theatre sold one of the items listed on the questionnaire (song sheets)—but sold eight others not otherwise indicated (ice cream, potato chips, pretzels, music box, automatic photograph, hot dogs, nuts, and cookies)—is revealed in Table 7.

Besides indicating the wide range of items sold in theatres, Table 7 further emphasizes—and adds a quantitative significance to—the fact the industry has appreciated for some time: that the northeastern states have been the last to go in for popcorn and, probably, the first to see the advantages of candy. In this area, 95 percent of the theatres sell candy, while only 63 percent report selling popcorn.

In the history of the modern theatre, one outstanding complaint from exhibitors has been the headaches induced by gum-chewing patrons, and the extra work involved from time to time in scraping the bottoms of the chairs to remove the accumulations of well-worn cuds. Accordingly, it was somewhat surprising to find that the No. 3 item, in point of theatres selling the item, is chewing gum! However, the old aversion is still prevalent in some quarters, so eloquently expressed on one return on which was written, "No! Not if you'd give it to me!"

TABLE 6—Range of seating capacities and averages for the several sections of the country as represented in the extra-profits survey.

	Range	Average
Northeast	189-2500	676
South	156-2000	515
North Central	200-2731	580
Mountain	165-1500	451
Pacific	300-1665	663
U. S. TOTAL	156-2731	600

Most extra-profits items are comestible, but things as star stills, magazines, and records are such natural tie-ins that their presence occasions no particular surprise—nor does the smallness of the percentages of theatres using these items elicit any particular wonderment for no specializing source of supply exists.

An idea, albeit not new, comes out of the north central states, where several theatres have installed juke boxes. It has been frequently suggested by architects that where theatres have foyers, lobbies, or lounges of sufficient size, and the proper architectural arrangement, the prospective owner should consider the possibility of installing juke boxes for parting spare nickels from standees and those relaxing and waiting for the next show to be about to begin.

In connection with cigarettes, no effort was made to correlate the population of the cities where were located the theatres that sold cigarettes, but it became quite apparent that only in the larger cities were these items on the sales list.

The sale of ice cream in many cases

TABLE 7—Percentage of theatres selling various extra-profits items, broken down by sections of the country, with the United States national averages.

	Candy	Popcorn	Beverages	Gum	Cigarettes	Magazines	Stills
Northeast	95.0	63.0	17.6	28.5	11.1	0.5	0.5
South	71.5	97.0	18.8	55.0	9.1	0	0.8
North Central	74.0	94.5	13.2	40.5	4.5	1.0	1.0
Mountain	81.5	95.6	13.3	59.0	13.3	0	0
Pacific	93.0	91.0	45.5	61.4	28.0	1.7	0
U. S. TOTAL	84.4	88.2	19.0	41.5	10.1	0.7	0.7

	Records	Song Sheets	Ice Cream	Potato Chips	Pretzels	Music Box	Auto. Photo	Hot Dogs	Nuts	Cookies
NE	0	0	3.0	2.5	0.5	0	0	0	0	0
S	0	0	5.3	1.5	0.8	0	0.8	0	0	0
NC	0.5	0	5.4	0.5	0	0.5	0.5	0.5	0.5	0
M	0	0	13.6	4.6	0	0	0	0	0	4.6
P	3.5	0	14.2	0	0	0	0	0	3.5	0
U.S.	0.5	0	5.7	1.5	0.3	0.3	0.3	0.2	0.5	0.2

was in the popsicle type, but the more traditional form was sold, and, frequently, in conjunction with a store in association with (although not necessarily operated by) the theatre.

In a further breakdown of the data on the returns, an interesting table was framed, based on the number of items sold by theatres. From the data of Table 8 it appears that theatres selling one, two, or three items are about equally divided.

While the data show a restricted stock-in-trade, some theatres really take the business seriously, and a leaf out of the drug-store business, with at least one theatre offering candies from 6 cents to $1.50, gum (both regular and bubble), cigars and cigarettes, Tums, razor blades, handkerchiefs, certain drug-store items (aspirin, B-C, and the like), and frozen dainties in season. This house, however, has an aversion to popcorn so long as it is necessary to pop it within the confines of the theatre.

TABLE 8—Percentage of theatres offering various numbers of different extra-profits items to the patrons.

	1 Item	2 Items	3 Items	4 Items	5 Items	6 Items	7 Items
Northeast	34.6	32.0	20.4	10.2	1.8	1.0	0
South	26.3	15.1	41.3	12.1	4.5	0.7	0
North Central	30.2	24.4	33.3	7.9	2.1	2.1	0.5
Mountain	18.2	18.2	40.8	9.1	9.1	0	4.6
Pacific	12.5	12.5	28.6	21.5	17.6	7.1	0
U. S. TOTAL	28.7	23.5	30.6	10.8	4.4	1.7	0.3

LOBBY STANDS, which are, for the most part, serviced from the rear, seem to be the preferred type of extra-profits equipment in most United States theatres, some 80 percent of the theatres having this type, including a small percentage also using machines for sales when counters are not attended or for spot sales in the more remote portions of the house. While many operators feel that a top-of-the-counter display helps to move otherwise slow-moving items, the concensus is that, as in this picture, the price of the items should be prominently displayed for patrons' information.



TABLE 9—Percentage of theatres retailing candy and popcorn, separately, together and in association with other merchandise items.

	Candy Alone	Popcorn Alone	Popcorn and Candy Alone	Candy (No Corn) and Others	Popcorn (No Candy) and Others	Popcorn and Candy and Others
Northeast	28.4	6.2	21.8	14.2	0	29.4
South	2.2	23.8	9.6	2.2	5.4	56.8
North Central	3.6	25.9	19.2	2.6	0.5	48.2
Mountain	4.5	13.6	18.2	0	0	63.7
Pacific	7.0	5.3	12.2	0	3.5	72.0
U. S. TOTAL	11.8	16.6	17.2	6.0	1.7	46.7

But what of the less expansive businesses? A breakdown of the returns, made on the basis of items and combination of items sold, gives the data presented in Table 9.

From these results, nearly 50 percent of the theatres selling extra-profits items restrict their sales to either candy or popcorn, or both. The surprising aspect, however, of the data is the fact that a measurable portion of the selling theatres (1.6 percent) handle no candy at all and only about 6 percent do not handle popcorn, both groups selling the while other items of refreshment.

Merchandising Equipment

While some theatres operated one kind, others the alternative type, and still more operated both, the breakdown on vending machines and lobby stands or counters is given in Table 10.

The results indicate, despite a multiple use, a 2½:1 preference for stands and counters. In this question, while reference was made to the lobby, as the place of location of stands, all stands, whether in lobby, lounge, or mezzanine, were included, since it was thought that stands are stands regardless of where they may be placed in the theatre. And, of course, placement is largely a matter of the availability of space and convenience. No doubt wherever both vending machines and stands were used, the former were in the more remote balconies and lounge rooms, or as standby equipment when the stand is not attended.

Since there are two ways in which a stand may be operated—and machines, too, for that matter—it was thought desirable to obtain information as to whether these counters and stands were operated by and for the theatre or leased out as concessions. The answers to this question are given in Table 11.

In Table 11 where the pairs of figures total more than 100 percent, it is due to the fact that more theatres reported employing both types of operation than theatres failing to give this information. On the other hand, where the pairs of percentages total less than 100, the reverse is true: that more theatres refrained from answering this question than those who have both types of operation.

Whether it is because concessionism is a rather new development, especially in stand operation, and theatres have not yet pondered the pros and cons of the matter; whether such consideration has been made and an adverse decision made; or whether concessionaire services are not available in many sections and more remote locations; the fact remains that there stands a 3½:1 condition of theatre operation of the extra-profits facilities.

TABLE 10—Percentages of theatres using different vending methods for extra-profits sales.

	Vending Machines	Lobby Stand or Counter
Northeast	44.3	71.2
South	18.6	98.4
North Central	22.8	77.5
Mountain	22.8	77.2
Pacific	43.8	84.3
U. S. TOTAL	31.6	80.0

However, to study this aspect of operation, a further breakdown of the returns was made, from the standpoint of the theatres operating machines, counters, and both types themselves or leasing them as concessions. The percentages on this basis are given in Table 12.

The base figure in this sub-calculation is somewhat less than for Tables 10 and 11, because only those theatres were considered that reported the complete information on this special analysis presented in Table 12. However the figures show 75.5 per cent of this group of theatres operating their own equipment, with 25.5 percent leased as concession—again, however, showing an approximate 3:1 advantage of theatre operation.

However, the inescapable fact stands forth in counter-alone operation, the theatre ownership-management is the form in vogue, while the machines alone, concessionism is a 3:2 favorite. It is thought that where theatres operate both machines and stands, and the machines are leased as a concession, the stand is also apt to be leased.

Without asking for specific information as to the amount—although some theatres gratuitously offered the actual percentages—it was requested that the theatres indicate whether or not the attendant of the theatre stands and counters were paid a commission or bonus.

The percentages from the returns are given in Table 13. Since it was manifest from write-in remarks that sometimes managers receive the commission (and from time to time both attendant and manager received a commission of various amounts), the table was expanded to include these data also.

It is interesting to note that in the Northeast—where the most and the largest theatres are located (compare Tables 1 and 2)—the area probably first to go in for candy and the last to take

TABLE 11—Percentage of theatres utilizing two different business operation methods.

	Operated by Theatre	Operated as Concession
Northeast	53.0	33.6
South	86.8	24.2
North Central	78.1	15.4
Mountain	86.2	13.6
Pacific	87.8	3.5
U. S. TOTAL	72.0	21.9

on popcorn—and where rugged individualism is synonymous with big business—about one in 10 theatres offers extra-curricular inducements to attendants at counters through bonuses or commission and only one out of 200 managers are in for such an extra profit of their own.

Types of Stands

Where theatres operated a stand-type of display for its extra-profits items, it was asked that indication be made whether it was an open stand or a closed counter and whether service was made from the front or rear. These data are summarized in Tables 14 and 15.

From an examination of the figures in Tables 14 and 15, a parallel, which was not unexpected, is evident: that where a sales unit is of the open-stand type, it is generally serviced from the front, and where it is a closed counter, servicing is from the back. There were exceptions to this general rule, with some open stands serviced from the back and some counters served from the front. However, these exceptions are thought to be occasioned by the local structural design, for both are possible.

Preferred Package

In setting up the question "What type of package do you prefer for best hand-

TABLE 12—Percentages of theatres, operating directly or as a concessionary lease, vending machines, counters or stands, or both types.

	PERCENTAGES OF THEATRES OPERATING			PERCENTAGES OF THEATRE CONCESSIONING		
	Machines Only	Counters Only	Both Types	Machines Only	Counters Only	Both Types
Northeast	18.6	74.2	7.2	29.7	30.8	39.5
South	6.6	84.2	9.2	4.0	96.0	0
North Central	11.3	76.8	11.9	5.6	91.2	5.6
Mountain	6.6	86.8	6.6	0	50.0	50.0
Pacific	11.7	75.4	12.9	50.0	5.0	0
U. S. TOTAL	11.7	75.4	12.9	19.6	56.0	24.4

TABLE 13—Percentages of theatre paying candy attendants or manager a commission or bonus on extra-bonus sales.

	Attendant	Manager
Northeast	10.6	0.5
South	18.0	0
North Central	24.8	4.0
Mountain	27.3	4.5
Pacific	24.6	5.3
U. S. TOTAL	18.8	2.1

TABLE 14—Percentages of two types of stands used in extra-profits merchandising.

	Open Stand	Closed Counter
Northeast	34.0	66.0
South	26.4	73.6
North Central	41.2	58.8
Mountain	40.0	60.0
Pacific	47.2	52.8
U. S. TOTAL	35.8	64.2

TABLE 15—Percentages of stand-types of displays with front and back service.

	Front Service	Back Service
Northeast	34.0	66.0
South	29.2	70.8
North Central	37.6	62.4
Mountain	42.2	57.8
Pacific	34.7	65.3
U. S. TOTAL	34.2	65.8

ling and display?" it was hoped to discover what the average exhibitor would like to have if he could name his own packaging material.

Perhaps that is what was obtained—and if it was, it shows an amazing agreement with what the manufacturers are presently doing, indicative of the fact that no radical changes are desired.

The data on this subject are presented in Table 16. Because most theatres indicated several types of container, or wrapping—because they felt that various types of items needed different materials—the regional and national figures yield total percentages far in excess of 100.

From the figures of Table 16, as well as the comments made at write-ins on the returns, it is apparent that the majority of extra-profits sellers are quite content to have their candy bars wrapped in cellophane, paper bags for their 5-cent popcorn, and cardboard containers for the 10-cent popcorn. But a single "other" preference was indicated, and that was for a type of foil.

Two principal "demands" were frequently mentioned: first, that the candy bar be wrapped in a transparent material—or with a transparent window if a generally opaque material were used—because it was felt that a bar that could be seen possessed greater sales appeal; and, second, that the wrappers be as noiseless as possible. Those who mentioned point two are content to go along with such materials as cellophane because of the sales appeal due to the transparency of the wrapping.

It is a bit curious to note that none of the returns made any direct references to the pop-ability of paper bags.

Saleable Price Range

From a cursory review of the types of merchandise offered in theatres (see Table 7), it is obvious that the heaviest sales come in the 5- and 10-cent items if for no other reason than there are more of these available than of those at the other price levels.

But just how the nation stacks up on the matter of the price range most saleable, and at what percentage, is presented in Table 17. Since several price ranges were mentioned by almost all the returns, the totals here are in excess of 100 percent.

The one interesting feature of Table 17 is the fact that the 50-cent item, while saleable, is almost "odd man out," being an article priced beyond that which one desires for himself and not quite good enough when it comes to impressing the girl friend.

Not all the returns presented the requested figures, and perhaps it is well for the figures presented in Table 17 are, of course an average based on percentages which, naturally, is not a mathematically accurate figure. However, an appreciable number of returns came in with just checkmarks to indicate the saleability of the various price groups.

Accordingly, the returns, as represented in Table 17 were recalculated and combined with the check-marked returns to form the basis of Table 18, presenting just what price-range items are the most saleable. Indication of several price levels here also result in percentage totals exceeding 100.

It should be pointed out that in the several price classes, a sort of "basic" rate has been maintained, and candies which, in pre-war times sold for 5 and 10 cents, and presently 6 and 11 or 12 cents, have all been grouped in the respective 5- and 10-cent groups. In this regard, it should also be pointed out that there is a persistent demand on the part of the theatres for a good 5-cent candy bar—and full value for that nickel!

The parallelism between Tables 17 and 18 further emphasizes the more or less obvious fact of the pre-eminence accorded the 5- and 10-cent items.

Volume of Sales

After learning what's what from the standpoint of the theatre and the supplier of extra-profits items, one final group of questions remains, and this involving the ultimate consumer, the patron who pays his money and takes his choice.

The final question was asked in two parts: the number of items sold for each 100 admissions and the average sales price. These data are summarized in Table 19.

The outstanding feature of Table 19 is the remarkable consistency of the business throughout the country. Only in the mountain states does the volume of business drop under 50 percent, and it is felt that, because there are the least theatres in this area—and, consequently, the smallest volume of questionnaires returned—this sub-median figure is explainably low. Yet even here the average return for the item sold is just as good (7.3 cents) as it is in the more populous northeast.

TABLE 16—Percentage of theatres indicating preferences for packages of certain types.

	Cellophane	Paper	Cardboard	Novelty Box	Other
Northeast	42.6	21.4	34.6	9.7	0.5
South	39.8	46.5	30.2	9.8	0
North Central	25.8	33.2	48.3	9.4	0
Mountain	27.3	27.3	50.0	9.1	0
Pacific	56.3	31.6	21.2	8.8	1.8
U. S. TOTAL	37.3	31.9	37.4	9.5	0.3

The average amounts spent by each purchaser, as given in Table 19, naturally reflects the over-all situation, without regard to methods of operation of management.

Accordingly the returns on which Table 12 was based were further analyzed, to see whether there was any detectable advantage one way or another over the type of equipment used in relation to operation by the theatres themselves or leased under concessionary agreement. From this analysis, Table 20 was developed.

The national totals on all types of theatre operation is 8 cents, while all types of concession operation bring in an average of 7.6 cents. (The blanks in the regional totals indicate classifications with insufficient data.)

TABLE 17—Price range most saleable on extra-profits items and the percentage of sales at each price level.

	5 cents	10 cents	20 cents	25 cents	50 cents	$1 and over
Northeast	72.1	29.0	8.3	9.7	2.5	6.8
South	58.0	45.6	6.3	7.	5.0	10.0
North Central	52.0	47.3	16.7	10.7	4.8	4.3
Mountain	66.8	30.8	1.2	2.7	0.5	0
Pacific	47.5	42.8	12.5	10.7	1.7	0
U. S. TOTAL	60.0	41.6	10.1	9.7	3.3	7.3

TABLE 18—Percentage of theatres indicating certain price levels as representing the most saleable groups.

	5 cents	10 cents	20 cents	25 cents	50 cents	$1 and over
Northeast	83.0	61.7	10.7	14.3	3.0	2.5
South	100.0	100.0	10.0	9.0	4.0	4.0
North Central	74.6	83.0	7.5	8.9	3.0	1.5
Mountain	82.0	68.0	13.6	13.6	4.5	0
Pacific	80.7	77.3	10.6	17.6	7.0	0
U. S. TOTAL	83.0	78.0	9.5	11.7	3.6	2.1

There seems to be one very good explanation — and probably others of a reasonable nature—that theatre operation should, by and large, result in a better cash return than under concession operation. It may be that in theatre operation, the theatre man has a very personal interest at stake in the deal and, therefore, pays more attention not only to what he sells but how he sells it—and there is no question but what that good old attribute of "Showmanship" plays a tremendous part in selling candy and popcorn and the other items as it does in promoting current and coming film attractions.

In concession operation, it is very easy, no matter how much Showmanship might have entered into the picture at the start of a venture (for impression-making, perhaps), for such a business as it develops—and there can be no question of its growth and development in the past few years—to acquire, however unwittingly, a caveat-emptor attitude with, as is true in some cases, the insistance of the concessionaire's own brands when the demand, proved time and time again, is for the nationally known confectionery by-words.

Four-tenths of a cent may not seem much, but it can amount to an appreciable sum—especially when this fraction, of course, is quite on the profit side. Suppose, for example, you own an average 600-seat theatre (Table 6) and you present 2.8 shows (Table 4), you have a potential capacity of 1,680 patrons. Now, if you are fortunate to have all seats occupied at all shows, and the average number of patrons (59.6) buy extra-profits items (Table 19) there will be 991 sales. If the facilities are operated under concession, the daily potential take, at a 7.6 cents per capita spending, amounts to $75.32, while under theatre operation the potential at 8 cents a head, would be $79.28—and the extra $3.96 is quite respectable extra Extra Profits.

It would seem, accordingly, most desirable for the prospective seller of extra-profits items to ponder long and hard, with plenty of paper-and-pencil work, to see what, in his particular situation, is the best deal. It is definitely not the intention here to decry the leasing of concessions, for there are no doubt many places where such operation makes possible a patron service which might not otherwise be economically desirable or even possible from the standpoint of personnel. And, of course, the business aspects of provisioning counters, stands, and machines—which in times of none-too-plentiful supplies of fast-moving items—can be headaches of the first magnitude, which are, naturally, obviated through concession operation, which also absorbs losses from pilferage, as well as provides the salary of the attendant.

TABLE 19—The number of items sold for each 100 admissions, and the average sales price.

	Volume of Sales (Percentage)	Average Amount (Cents)
Northeast	57.9	7.3
South	64.6	7.8
North Central	59.5	8.6
Mountain	49.7	7.3
Pacific	58.4	8.0
U. S. TOTAL	59.6	7.9

The preceding are facts as revealed by this one survey, and the data, together with the annotations, are offered strictly for what benefit may be derived from them in particular situations.

MANAGEMENT NOTES

Besides the spaces for the eight sets of questions on the main form, the questionnaire provided space for "any remarks on your 'extra profits' lobby stand experiences that you would like to pass along to other theatremen." Many respondents utilized this space, in addition to noting specific comments—some vehement—hard by the pertinent question.

From these gratuitous data can be culled interesting notes on management of various aspects of extra-profits merchandising. However, it must be borne in mind that these comments are from isolated individuals and in no way represent any regional or national consensus. And it must be remembered also that, as circumstances alter cases, what one theatre man finds valuable and expedient may be quite the reverse for another operator in different conditions.

Accordingly, what follows must be regarded as ideas, to be studied by the individual in the light of his own specific location—his theatre and its patronage.

Machines, Counters, Displays

Inasmuch as the survey has revealed a predominant liking for lobby stands or counters (Table 10) and the general tendency for the returns to average better with them than with vending machines (Table 20), it was to be expected that most comments on operation would refer to this type of equipment.

Whether a theatre uses an open display or a closed counter, it seems that there is general agreement on the policy of effective display to boost the sales of the item. It would appear that there is, through mass display, the tacit endorsement that "You'll like it"—and the patron convinces himself that such a volume of material must mean a lot of buyers and, hence, a better product. Coupled with mass display, some exhibitors feel that, even though there is some loss, it is advantageous to have the piled up candy bars where the patron may handle them.

In some cases, it has been found that open displays sell three times as many items as machines.

Another important angle was pointed out. Where a theatre is operated for a colored population, it is more or less mandatory to have a closed counter. While this type of merchandising equipment is installed, these operators find that many of the available stands do not have enough glass, so that a full display —and a visible one—may be placed in the body of the cabinet.

In the dispensing of ice cream and beverages, operators, where it can be done, find it desirable to have separate store facilities for this type of selling.

As to the placement of the stand, it is felt that the closer it is to the entrance the better—never hide a stand in a corner—and the greater the sales will be. Despite this—maybe because of this—some observers feel that a foyer stand will gross more than a lobby stand.

Packaging Material

The data in Table 16 indicate that, as a rule, extra-profits merchandisers are reasonably content with the type of package presently available and used, a satisfaction briefly summarized as cellophane for candy, paper for 5-cent popcorn, and cardboard boxes for 10-cent popcorn. As to candy, in particular, many feel that it does not really matter what the wrapping is, providing the bar is attractive and a good-seller.

While satisfied, more or less, with cellophane for candy bars, theatres do appreciate two faults: (1) that it is

TABLE 20—Average sales (in cents) at machines, counters, and both types, according to whether the equipment is theatre-operated or leased as a concession.

	AVERAGE SALE, THEATRE OPERATION			AVERAGE SALE, CONCESSION		
	Machines Only	Counters Only	Both Types	Machines Only	Counters Only	Both Types
Northeast	6.8	8.2	7.1	5.7	7.1	6.5
South	6.6	7.2	7.9		9.5	
North Central	9.4	8.5	8.8	5.0	9.4	8.3
Mountain		6.6	7.9			
Pacific	6.7	8.8	7.7		6.6	
U. S. TOTAL	7.6	8.1	8.1	5.2	8.6	6.6

or can be a source of annoying noise in the auditorium and (2) that the cheaper grades of cellophane disintegrate easily and make the merchandise unsaleable.

Indeed, the ideal wrapping would seem to be something transparent (to permit visual appraisal of the contents), stiff (to allow easy handling), quiet (to eliminate disturbing noise in the auditorium), and inexpensive (this last particularly in reference to theatre-purchased containers such as are used for popcorn).

Price Range

Three classes of comments were noted in connection with the returns on the question pertaining to the saleable price.

In the first place, the idea was expressed in no uncertain terms that cheap candy, at whatever price, must go if a satisfactory volume of sales is to be maintained. And in place of these inferior items, there is a demand for standard, nationally-known brands, for it is felt that such brands will be bought, other factors being equal, anyway—but it will be bought inside the theatre if it becomes known the theatre carries the desired brand.

The second demand is for the theatre to realize that candy must be sold by theatres at prices in accordance with the rise in prices of ordinary comparable merchandise. The time, they feel, is here when theatres must be reconciled to a reduction in prices in neighborhood shops selling the same items and when the theatre must impress on its jobbers and concessionaire the fact that merchandising in theatres is no different than it is in stores selling the same merchandise. In short, the party is over. The patron is watching his confectionery money and, in a market that is getting tighter, candy men will have to give an honest value to make the patron part with one or two or even more of his valued nickels.

Akin to the preceding is the third demand: that nickel and dime candies be sold for five and ten cents, not, respectively, 6 and 11 or 12 cents. In the face of rising costs, the theatremen realize that, for such a thing to be consummated, the size of the bar will probably have to be cut. All right, they say, make the bar smaller—the public appreciates (in part, at least) the candy man's difficulties, but still let the manufacturer put into his bar a full nickel's worth of candy satisfaction. And this satisfaction comes, the theatres think, in the public's munching its nationally-known bar at five cents each!

Sales and Saleability

The sales and saleability of various extra-profits items depends on what items are being sold. Such phraseology may seem a bit on the silly side; yet, judging by what has been written on the questionnaires and gratuitous information, all items seem to have their advocates, and the advocates have had success with those very items.

For example, one theatre man raises a hand in horror (the other one is taking in the nickels and dimes for candy) and shrieks, "God protect us from what happened to drug stores!"—and the "next" return declares, "We sell candy (priced from 6 cents to $1.50) and gum (both regular and bubble), cigars and cigarettes, Tums, razor blades, handkerchiefs, and certain drug store items, such as aspirin, B-C, and so forth. We also sell frozen dainties in season."

Aside from an expected clash of opinions on the relative merits of the various items—and on extra-profits merchandising in general—one fact stands out in high relief for the serious consideration of extra-profits operators: that care must be exercised in the combination of items that are sold—at least, to appreciate the fact that a sale is a sale and that a coin spent for one item, at its percentage profit, cannot be spent on another item at, perhaps, a greater profit.

Many operators, who started their extra-profits venture on popcorn, and later added candy, have found that the money spent for candy was not spent on popcorn, and since the margin of profit on the popcorn was much more than that on candy, they found their net profit—despite increased volume of business—decreased. Some operators point out that potato chips should not be sold along with popcorn.

Annotations on the returns revealed much interesting information concerning the actual volume at certain theatres While the figures are impressive, they were not written in with sufficient frequency so that any factual analysis could be made. And since no figures were asked on total weekly attendance, it would be impossible to translate the proffered facts to any basis from which a general conclusion might be drawn.

But regardless of the magnitude of the take on extra-profits, there can be no question but that it offers the theatreman a substantial bolstering of the theatre's income, being sufficient, at times, to underwrite the ticket taxes and, at other times, to pay the cleaning bill—but all the while adding a tidy sum to the bank balance.

Management Aspects

Assuming that quality merchandise—such as name brands in candy, high rating grain and seasoning in popcorn, and comparable characters in other extra-profits items—is the basic principle on which to establish this extra-profits business-within-a-business, three fundamental rules of operation according to the consensus of the comments set forth on the returns, must be established and diligently pursued.

These operational rules, most logical and very simple, are really only two, yet one particular item was mentioned separately so frequenty it must be raised to independent rank.

First of the Three Commandments is Cleanliness: Keep counters, displays, and machines neat and immaculately clean. And the idea of spotlessness also carries over and is equally applicable to the attendant.

Second basic rule is Attractiveness: Keep counters and displays well-filled, good looking, and well lighted.

And the third fundamental is Proper Personnel: Be sure the attendant (preferably uniformed) is courteous and neat, and is thoroughly schooled in her salesmanship job so that she knows how to increase sales and the turn-over in otherwise slow-moving articles (some consider that a commission or bonus makes for more efficient, harder-working attendants).

With these basic principles of extra-profits operation, no one can find fault—every one agrees with them "in principle"—but all too frequently it is a human failing to become lax in some of the most obvious duties.

SODA FOUNTAINS, as represented by this one at the Adams Theatre in Quincy, Massachusetts, are generally apart from the theatre proper. This one has its entrance from the theatre lobby, although at a position where, to be reached, the patron must have passed the doorman, thus restricting patronage to the theatre trade. The theatre also has a counter located on the other side of the lobby.



Sales Promotion

While most patrons who patronize extra-profits facilities in theatres do so of their own free will and accord—subtly allured, perhaps, by the availability of these refreshment items, set forth in accordance with the management principles just discussed—the possibility of increasing this buying should not be overlooked. After all, there is no business so completely good but what it could be better!

The questionnaire did not directly question its recipients on means of promoting extra sales, but in the space provided for additional comments some ideas were set forth, a few of which may be mentioned here.

The first sales booster, of course, is the obvious one: that pleasant odors can "do things" to a person, even to create desires to satisfy a longing (albeit unrealized) for the article effecting the aroma. Recognizing that sound psychological fact, some observers urge that corn be popped at the theatre, and made fresh one or more times every night. The aroma sells!

Prize packages are nothing new, but at least one theatre man has played to that human weakness—the desire to get "something" for "nothing"—by inserting theatre passes in a number of the popcorn boxes. He finds the increased sales to people, whose supreme passion is to "see the moom pitchers for free," far exceeds the value of the admissions thus given away.

A feat of promotion somewhat more difficult to accomplish is the idea of setting a 25-cent "Candy Treat of the Week," where each week a new item is made available—with the proper advance and continuing ballyhoo.

During that period when only the scantiest quantities of name brands of candies were being delivered, and when the available bars (particularly of the type adaptable to machine vending) showed little alacrity in the transfer to the buyers' hands, one theatre man got a great idea—and one which might be worked even in days of more plenteous supplies. Recognizing that, however innocuous it may be, most people have a liking to gamble, especially if they think they have a better-than-average chance to win. Accordingly in one, two, or three spaces in his vending machine, he replaced every second, third, or fourth package of a slow-moving item with a name-brand bar. Then, to create interest among the customers, he labeled the windows with such teaser gags as "Take a Chance!" "What Next?" "What Have You?" He found that these columns were played like a slot machine, and emptied many times to one of the others.

Even in extra-profits merchandising, there can be showmanship!

Future Indications

It is quite true that, as the poet, Thomas Campbell, stated a century ago, "Coming events cast their shadows before." But the future of extra-profits merchandising is no ethereal adumbration: it is definite that such merchandising will go on to bigger—and, it is to be hoped, better—selling on a more and more expanded basis, not only in volume but in the number of items sold.

The whole history of this business-in-a-business points to that future, as do the comments on the filled-out extra-profits questionnaires. While the actual number of returns revealing the anticipations for the future are few, the trend is uniformly the same: where candy is sold, popcorn will be added; where popcorn is sold, candy will be added; where 5- and 10-cent items are now sold, the line will be expanded to include $1 to $1.50 items; where edibles are sold, such items as cigarettes, records, and star stills will be added.

Nor is the expansion program limited to the theatre and the items sold over the candy counter or beverage bar, but it also includes the expansion of these facilities into theatre-operated stores, designed to serve the street trade as well as that of the theatre.

While, as it will be seen a little further on, some theatre ceased operations in the extra-profits field because of lack of an adequate supply of items deemed suitable to theatre selling, no theatre in this present survey indicates that it will cease this manner of customer service.

NON-SELLERS' COMMENTS

That this discourse has been devoted to the facts—maybe a few fancies—and the data pertinent to the actual theatre merchandising of various items is, of course natural. And while it was more or less assumed that, from the nature of the questions asked, non-selling theatres would ignore the form, a representative number did reply—and a generous proportion offered an explanation.

The surprising fact revealed by a tabulation of the comments was that more than a third of the theatres—35.3 percent, to be exact—were seriously considering adding facilities for extra-profits merchandising where either equipment or products, or both, would again become available.

The next group included those theatres militantly outspoken in their opposition to turning theatres into stores, with 29.4 percent being in this class. It is interesting to note that into this category fall the 119 theatres operated by Loew's, Inc. —the one major theatre circuit not having succumbed to the extra-profits lure.

Theatres formerly in the selling group, but which abandoned the practice amount to 17.6 percent. About one-third of these theatres gave up extra-profits merchandising when it developed that the "extra" referred only to the headaches induced by scarcity, and even absence, of good saleable items and "profits" was a word found only in the dictionary. However, these theatremen are not discouraged, for, when times were good and supplies plentiful, extra-profits selling was a paying adjunct to theatre operation, and, accordingly, they are all for trying it again.

The two-thirds in this discontinuation group represent those who took out the facilities after long and concerted complaints from patrons that the noise from wrappers, bags, and boxes were too distractive. Here, however, there is a ray of hope on the part of the theatre man, for he, with his selling brothers, looks to the time when science and industry shall develop silent wrappers and containers. When that time comes, he says, he will be right back again in the candy and popcorn business!

The last part of this group—17.6 percent, the same as the preceding group—represent those theatres which have made other arrangements for these activities. One group of theatres is located in public buildings where such selling is not allowed. Another portion represent theatres rented in business buildings where the owner, to protect an earlier established candy store, refuses to allow the theatre to sell. And yet other theatres have working agreements with candy and refreshment stores in proximity to the lobby. Even in this whole last group, while most of the theatres do not of themselves do any selling, they nevertheless are in situations where patrons have such facilities available.

SUMMARY

The 1947 Extra Profits Survey, as the results from reports of the extra-profits theatres have been tabulated and presented herein in a regional breakdown, may be summarized on a national basis as follows.

(1) The estimated percentage of theatres selling extra-profits items is 94.4, while the non-selling theatres is 5.6 percent.

(2) Among the selling theatres, 60.4 percent claim to be first-run and 39.6 subsequent run. For the non-selling theatres, these percentages are, respectively, 47.3 and 52.7.

(3) The number of shows a day in the surveyed theatres range from one to eight (continuous), with an average number 2.8 shows.

(4) Theatres selling extra-profits items classify themselves 46.0 percent as of main stem location and 54.0 percent as of residential areas. Similar figures for non-selling theatres are, respectively, 57.2 and 42.8 percent.

(5) Seating capacities of the surveyed theatres range from 156 to 2731, with an average of 600.

(6) The extra-profits items sold, with the percentage of the theatres reporting such sales follow: Candy, 84.4; popcorn, 88.2; beverages, 19.0; gum, 41.5; cigarettes, 10.1; magazines, 0.7; star stills, 0.7; records, 0.5; song sheets, 0; ice cream, 5.7; potato chips, 1.5; pretzels, 0.3; music box, 0.3; automatic photograph, 0.3; hot dogs, 0.2; nuts, 0.5; and cookies, 0.2.

(7) From one to seven items are included in theatres, with most theatres selling one, two, or three items, or an average of 2.4 items.

(8) Nearly half of the reporting theatres (46.0 percent) sell candy, popcorn, and other items, while 11.6 percent sell only candy, 16.3 percent sell only popcorn, and 16.9 percent sell only candy and popcorn. Theatres selling candy and other items but no popcorn amount to only 5.9 percent, while theatres selling popcorn and other items but no candy amount to 1.6 percent.

(9) Eighty percent of the theatres operate lobby stands or counters, with 31.6 operating vending machines.

(10) Theatres operate 72.0 percent of the extra-profits facilities, with 21.9 percent of such facilities as concessions.

(11) Where the facilities are theatre-

operated, 11.7 percent are vending machines, 75.4 percent are counters and stands, and 12.9 are both. Where the facilities are concession-operated, 19.6 percent are vending machines, 56.0 percent are counters and stands, and 24.4 percent are both.

(12) Counter attendants are paid a commission or bonus in 18.8 percent of the theatres. In 2.1 percent of the houses, the manager receives the cut.

(13) Of the stands used in extra-profits merchandising, 35.8 percent are open stands and 64.2 are closed counters. The stands in the theatres are, in the 34.2 percent of the cases, served from the front and, in 65.8 percent of the cases, served from the back.

(14) The percentage of theatres giving preference in various wrapping material or containers are cellophane, 37.3; paper, 31.9; cardboard, 37.4; novelty box, 9.5; and other, 0.3.

(15) The percentage of sales made at various price levels follow: five cents, 60.0; ten cents, 41.6; twenty cents, 10.1; 25 cents, 9.7; 50 cents, 3.3; and $1 and over, 7.3. Similar data are revealed from theatres merely indicating a preferred price level, but without volume-sale figures.

(16) The number of items sold for each 100 admissions is 59.6, and at an average unit price of 7.9 cents.

(17) Under theatre operation, the average unit sale through vending machines only is 7.6 cents; through counters and stands only, 8.1 cents; and through both, 8.1 cents. Under concession operation, the average unit sale through vending machines only is 5.2 cents; through counters and stands only, 8.6 cents; and through both outlets, 6.6 cents.

CONCLUSION

With a current average $303,000,000 income a year, over and above the annual gross from the sale of admission tickets, American theatredom, having become introduced to relative easiness of extra-profits merchandising, will continue to develop this facet of theatre operation and to widen its scope.

Candy has long been an adjunct to the theatre, first in the legitimate houses and then in the cinemas, and popcorn, long associated with circuses and summer amusement resorts, but once started in theatres, has come up strong to a point where, in the national picture, it actually has top sales billing over candy.

Just as the theatres can hardly overlook the possibilities of the added source of revenue, neither can the manufacturers, jobbers, and dealers ignore the potentialities of this field. And especially in the light of the fact that this additional revenue represents new money, not nickels, dimes, and quarters spent in the theatres rather than at other establishments. The record shows no case of an established candy shop that has been hurt by the establishment of extra-profits selling in theatres. Indeed, one needs only to walk a few blocks in any city until there can be found candy stores, smack dab against a theatre lobby (and even with an entrance to it), doing a land-office business—and in the theatre a candy counter doing a splendid business.

As one takes an over all view of the situation, there seems to be three major problems. Since the theatres have proved that they want to sell and that they can sell, these problems are more on the doorstep of the manufacturers than with jobbers, dealers, or theatres. First of these problems is one that time will unquestionably solve: the appearance in generous supply of nationally-known brands. Given an ample supply of sugar and the other raw material going into confections, the name-manufacturers will be only too glad to have their products available in quantities to meet the demand.

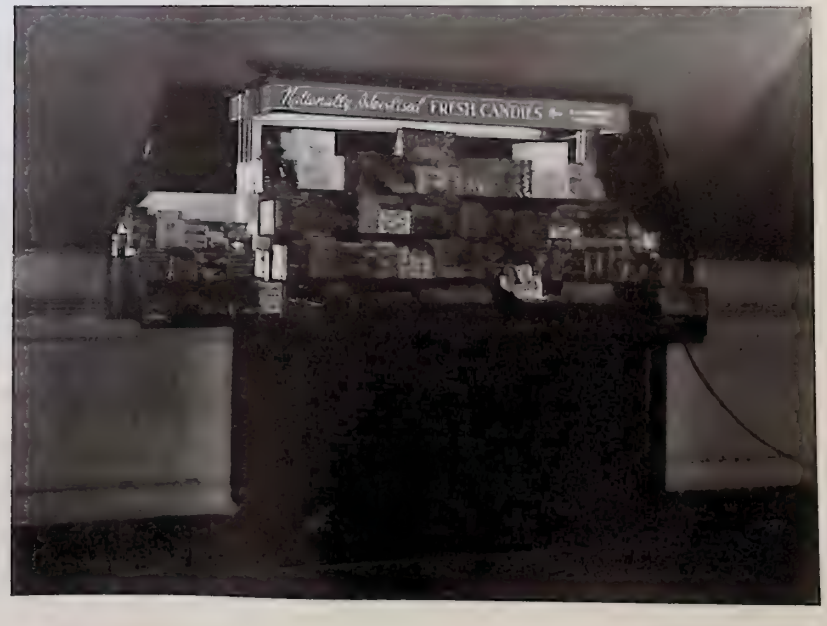
Second problem is that of quantity and quality. As in the first problem, the present one of quality will resolve itself as the passage of time brings more ample supplies of raw materials. The quantity aspect is important. The public hates to be bothered with pennies, especially when it has become accustomed to an even nickel, and, therefore, it resents having to shell out six cents for a five-cent candy bar. And what has made matters even worse is that the public has not felt that it has been getting even a nickel's worth for its six cents! Thus, the problem resolves itself into making a bar that can retail for five cents—and be worth five cents.

While the first two problems are concerned, directly or indirectly, with the theatre patron as an individual purchaser, the third involves him as as one of a theatre audience. This problem refers to the wrapper for the candy bar, and the demand for a material which, above and beyond all other necessary considerations—such as the protection of the bar itself—shall be silent as it is being folded and crumpled as the bar is being nibbled into nothingness. The problem is not hopeless—organic chemists, particularly in the field of transparent plastics, have done magnificent jobs in developing special material with special characteristics for special needs. Surely the manufacturers' profits out of a quarter of a billion dollar business could instanter—or, at the most, in a very few years—wipe out all the charges of research, development, and commercialization of the new material. And such a material would, of course, result in increased sales, particularly by the bars so wrapped going into theatres now not using candy bars on account of the noise factor.

Granted that the time is not far distant when the industry shall have solved all three of these problems, there will probably yet be problems for the theatre, and problems on which manufacturer, jobber, and dealer—and the theatre architect—will have to cooperate. The theatre is willing to sell—and can do a good job of it—but merchandising methods can be improved, better methods of handling extra-profits items devised, and better display and operational techniques designed. And all of these things will have to be backed by better equipment, equipment not only designed to do a better job, but also designed to fit the location in the particular, so that all natural advantages can be realized and any disadvantages minimized. Then, too, there are matters of storage, inventory, and other strictly intra-mural matters to be better adjusted.

But extra-profits merchandising is, so far as the theatre is concerned, hardly out of its swaddling clothes—and as theatredom's newest "prize baby" it has shown tremendous development and even greater potentialities for the future. With the cooperation of all concerned, extra profits might even become the nation's next major industry!

FRONT-SERVICE COUNTERS, such as this one at the Lee Theatre in Lee, Massachusetts, are to be found in more than a third of the country's theatres. While most stands of this type are serviced from the front, some are so constructed as to employ rear service. This type of stand is designed to be closed and locked, with a minimum of demantling, when the attendant goes off duty at the day's end.



Popcorn Is a Soundly Profitable Business!

A Comprehensive Study of All the Factors To Be Recognized for Keeping It That Way!

CHARLES B. BLOOD
Star Manufacturing Company, Inc.

FOREWORD

"Popcorn is a business." That phrase to a great many people seems very strange. To tell a person you are in the popcorn business is only to receive a look that says, "Are you nuts?"

We, who are in it wholeheartedly, know that we aren't "nuts" and that it is a real business—and a profitable one. But, as much as we hate to admit it, there are some in the field who do not realize that it is a business, and who, regardless of what part of the industry it is they are working, have not taken time to study the industry as a whole. It follows that their particular operations are not at all an asset.

Many years ago a few brave men started to introduce popcorn as a commercial product. They have worked hard and long to build up the industry to the place that it holds in the field today. The going was slow and rough, but gradually more and more became interested and joined the movement so that popcorn has become universally accepted and there is a general rush to get into every phase of the industry.

This rush in many cases has not been sound. The easy money was tempting and the sudden splurge was to take the profits with little consideration that they were entering a field which was entirely new to them. As a result, many have and are falling by the wayside, and, as they fall, they are partially tearing down the very thing that we have all been trying to build up.

Popcorn is an established business—not a fad! Let us all realize this fact and work together to build up the entire industry. It is a growing business. It is a sound business. It is a profitable business. Let us keep it that way!

This article is directed toward one single phase of our large industry, the individual retail popcorn-machine operation. It is my only hope that every person reading this article may find at least one fact that will make his operation simpler, more profitable, or his product higher in standard and in this way help this grand industry of ours.

With the thought that some might keep this article for future reference, the text has been broken down into sections pertaining to the general operation of a popcorn machine.

THE RECESSED THEATRE CONCESSION STAND is one of the popular spots for locating the extra-profits activities. As in any other retail operation, the selection of a location is of extreme importance. Whether you are trying to pick a spot in a shopping district or are trying to locate a machine in a theatre lobby, it is extremely hard to list cut-and-dried rules for selecting the proper location.



SELECTING A LOCATION

As in any other retail operation, the selection of a location is of extreme importance. Whether you are trying to pick a spot in a shopping district or are trying to locate a machine in a theatre lobby, it is extremely hard to list cut and dried rules for selecting a location. However, there are several things that must be kept in mind.

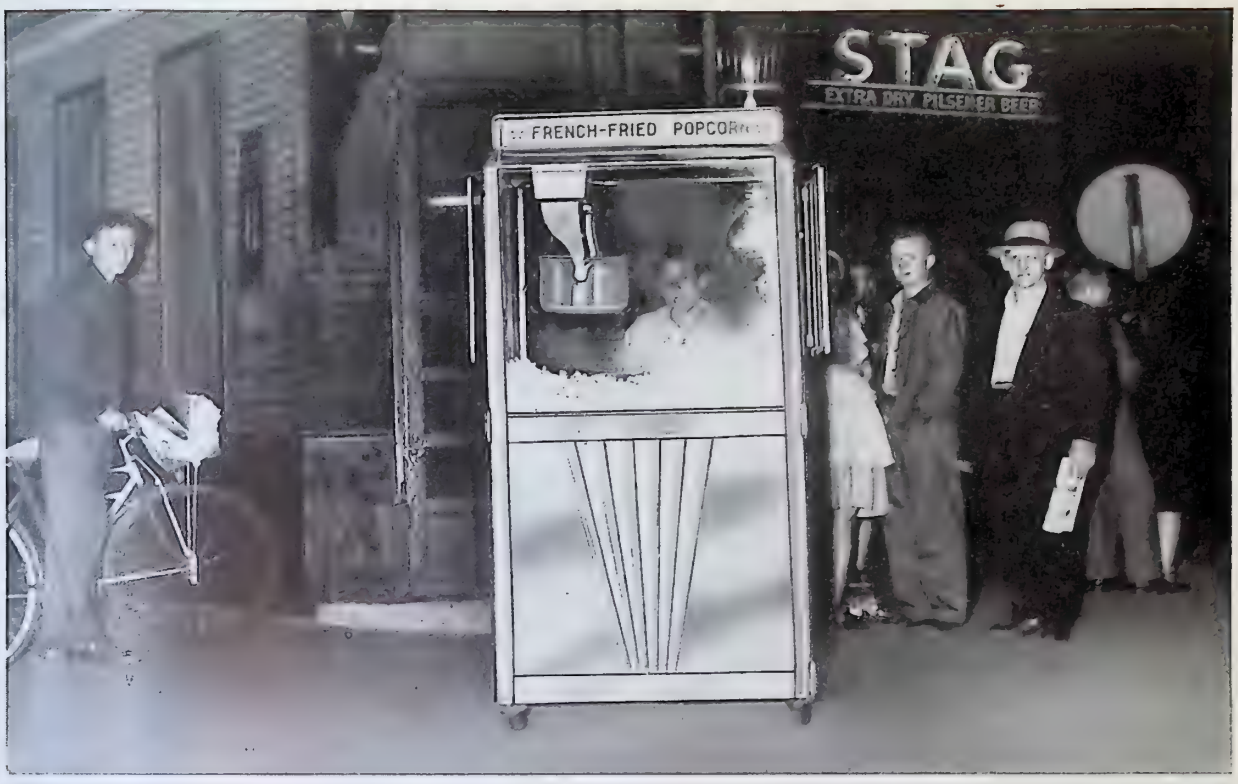
First, all of your locations must have traffic, for the volume of business depends on the number of people to whom you are offering your product. Generally speaking, a larger percent of sales will come in locations where people are relaxing from the rush of things, rather than in locations which are in the heart of busy business centers with all the rush and pressure of daily living.

Your machine, stand, or process must be easily visible to your customers. The greater activity around a popcorn stand —such as corn popping, waiting on trade, and so forth—draws the attention of the passersby and, as a result, additional customers. Do not hide your operations. Keep them in front of the people, and they will respond.

Remember that you are handling and selling a food. Your location must be able to meet all sanitary and health regulations.

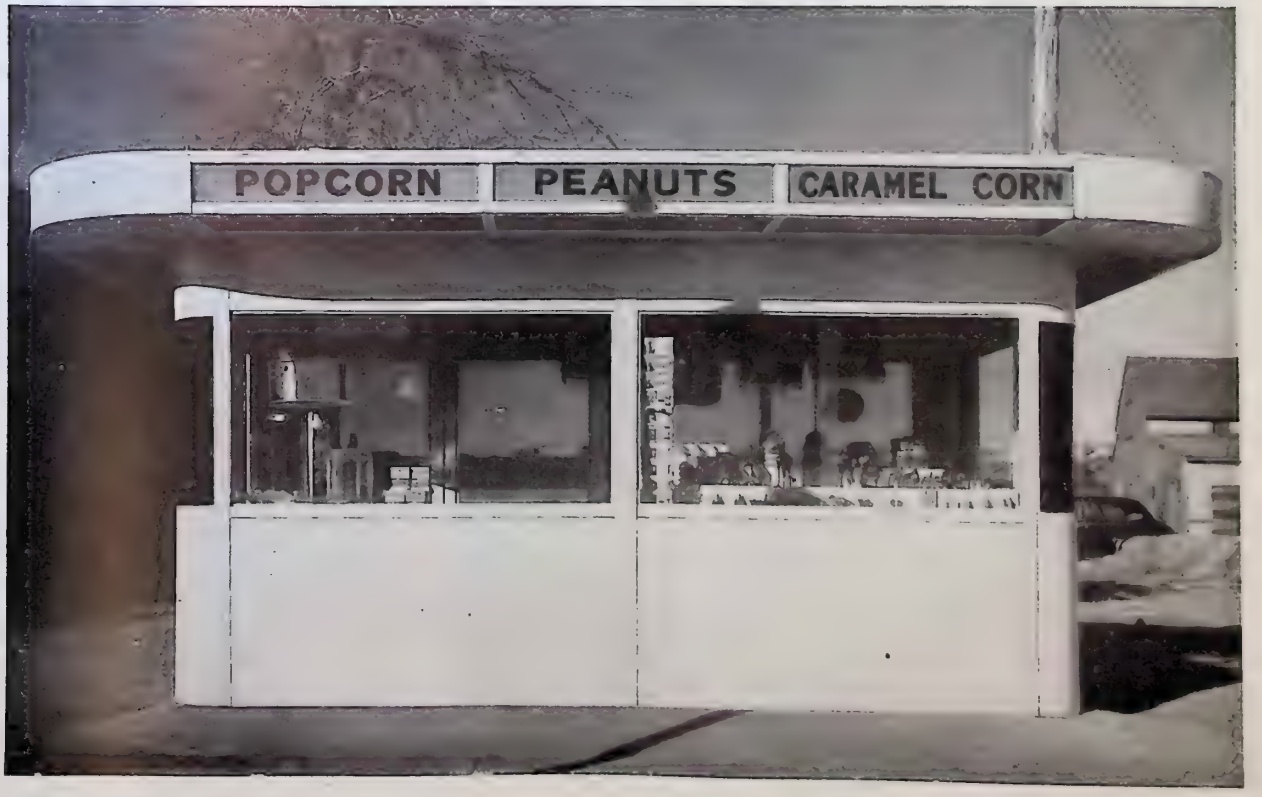
Sufficient power or heat supply must be available. Keep these in mind. It will reduce installation costs.

Especially in theatres consideration



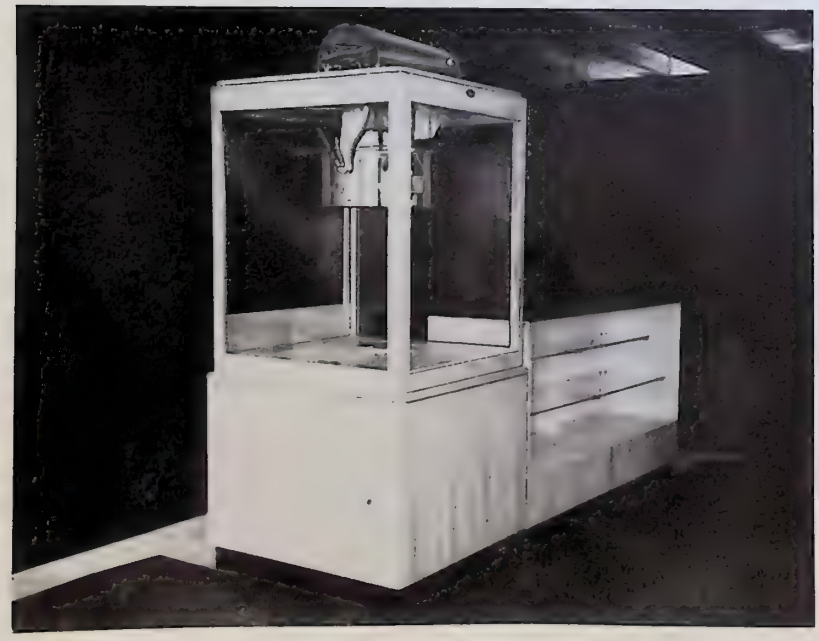
THE SIDEWALK STAND can be adapted to theatre purposes. All locations for stands must have traffic, for the volume of business depends on the number of people to who you are offering your product. Generally speaking a larger percentage of sales will come in locations where people are relaxing.

THE OUTSIDE STAND will probably find greater service as an adjunct to regular concession operation at drive-in and other types of outdoor amusement centers. Everywhere the machine, stand, or process, should be easily visible to potential customers. Activity and aroma beget many sales.





A STANDARD FLOOR MODEL of popcorn machine is adaptable to many positions and can easily be arranged so that it fits in properly with other extra-profits ventures of the particular theatre.



A LARGE CAPACITY POPPING UNIT may also be used in a variety of situations in theatres where the potential demand is considerably more than that which is provided by the standard model.

must be given to fire department regulations. Ingress and egress laws must not be violated. Have plenty of room for your customers, so that traffic is not blocked during your rush hours. The machine or stand should not in any way block any exits.

SELECTION OF EQUIPMENT

This subject is of extreme importance in the operation of your business. It is not so much a question of "what make shall I buy?" for there are several reliable manufacturers of quality equipment in the field, but rather of "what type, size, or capacity equipment do I need for this particular operation?"

Most of you are familiar with the fact that there are two general methods of popping corn, the "wet pop" method and the "dry pop" method. In a wet popper, corn, seasoning, and salt are put into the kettle simultaneously so that as the corn pops out it is ready to serve No extra seasoning or no extra steps are necessary in the preparation of the corn. In the dry popper, corn comes out unseasoned and must have seasoning and salt sprinkled or sprayed over the kernels before serving.

It is more or less a foregone conclusion that operators specializing in seasoned popcorn use the "wet pop" method. Experience has taught them that this is the speediest, most efficient, and most economical way to handle this type of corn. With a wet popper you can secure the even, consistent seasoning of all kernels without having extra and entirely special equipment.

The "dry pop" method becomes more practical in extremely large installations, primarily for the purpose of packaging corn where the large additional investment for special seasoning equipment is worthwhile.

At the present time there are three distinct ways in which operators are handling their retail corn sales. This again refers particularly to theatre operation but can be applied to nearly all retail locations.

The most popular methods is to install a complete corn popper at the point of sales, so that the customer can actually see and smell the corn as it is popped. This is an extremely important sales stimulant. It should not be overlooked. Remember, people are curious and they like to see the product they are going to eat actually produced. Then, too, many are fascinated by the sight and the sound of the corn popping. And, there are very few whose appetites are not stimulated by the delicious aroma of freshly popped corn. Keep these thoughts in mind in making your installation.

The second method is to pop the corn away from the point of sales and merchandise it in a "warmer." Usually a large capacity popper is installed back stage or in a basement, or the corn is purchased from a wholesaler, placed in a warmer and sold from there. The big problem here is to be able to furnish your customers with fresh, hot popcorn and being able to create some artificial "activity" to draw additional attention.

The third method is coin-operated vending machines. This is similar to the method explained in the paragraph above. The corn is popped in some central location and distributed to the ven-

dors. The difficulty again is maintaining fresh, hot popcorn. This method of operation also lacks the stimulating effect of a sales person or animation that surrounds "on the location" popping.

After determining which merchandising method you wish to use then you can select the equipment best suited for the job.

Should you decide to install a complete corn popper at the point of sales, you must decide what capacity popper you will need and what size cabinet will best fit into the space you have allotted for the machine.

It has been my personal experience that too large a capacity machine for a location is worse than a machine that can just barely keep up with the trade, for if you have a machine that will pop more corn than is required, you have long periods of idleness and inactivity in the stand, in this way losing the sales benefit that is derived from continuous popping and activity. By using a smaller capacity machine, the personnel is active, your machine is in operation all the time and you are drawing the attention of prospective customers. With inactivity in the stand, it is harder to draw this much needed attention.

Should you be using the "warmer" method, this thought is not at all true, for you will find it more profitable through a savings in labor to use a "commercial" type popper which has an exceptionally large popping capacity. As a general rule, your investment is less for the popping setup which is out of sight of the customer, for it does not have to be dressed up, although the thoughts of cleanliness and efficiency of operation must be kept in mind when making the installation.

Many large theatres and other retail locations with heavy traffic have found it to be profitable to use a cabinet model machine at the point of sales, in this way capitalizing on the sight and aroma of fresh popcorn. This machine is then backed up with a commercial unit that is out of sight of the customers. Such an installation gives them all the sales advantages and yet sufficient popping capacity to more than take care of the rush periods.



A LARGE CAPACITY POPPER, located in the basement of the theatre, will be able to back up the machine in the concession stand upstairs. Such equipment comes in handy when the vending area is comparatively small and the potential volume of business large and when, regardless of the vending area, the demand for popcorn is greater than the capacity of the stand's equipment and personnel.

INSTALLATION, OPERATION

The planning of operation and installation of equipment is of prime importance in gaining an efficient operating unit. Hastily developed plans mean possible lost labor hours, slow operation, slow service and lost dollars through costs that are unnecessarily high.

Place your equipment in such a position as to give the operators plenty of room to work. If you have a counter in connection with this machine, give ample working space so that two people working together are not walking all over each other.

Plan ample storage space for bags and other supplies, making it easily accessible for the operators. Arrange for convenient money drawers, safe yet handy to avoid those extra steps.

Above all, see that the power supply is sufficient for the efficient operation of your machine. No equipment will operate properly if it does not have enough current. It is foolish to save a few dollars on the installation if it will cost you money in greatly decreased efficiency throughout the lifetime of the machine.

Again, we want to remind you that you are manufacturing a food. Common sense thought of sanitation problems and plans for keeping equipment immaculate will save many a headache and will give you a higher quality product.

Check the local electrical and fire-protection codes. Much money and trouble can be saved by seeing the proper authorities before making an installation. In this way you are always in the right.

You have demonstrated your faith in the particular equipment you have selected by buying it. Now is the time to back up that faith by believing a little in the knowledge the manufacturer has of his equipment. Here are a few don'ts the wise operators follow to secure full satisfaction from their investment:

Don't attempt to install or operate any piece of equipment without first reading the instructions carefully. After reading them, follow these instructions to the letter. The manufacturer knows his equipment and how it should be installed and operated. Capitalize on his experience.

Don't make any changes in the electrical or mechanical features of a piece of equipment without first consulting the dealer or manufacturer. There are no legitimate manufacturers that ship any equipment without a very thorough final inspection and test. They know that the equipment is right when it leaves the factory. If you attempt to rebuild it to suit your ideas, you cannot expect the manufacturer to stand back of it.

Don't attempt to cut corners to save a dime in making the installation, for in so doing you are hazarding and in many cases forfeiting sound, efficient operation. This is the expensive way of installing equipment.

After you know that your installation is properly made, read again the instructions for operation. Follow these instructions carefully until you are entirely familiar with the equipment. After operating it for some time and becoming absolutely familiar with the equipment and with the operation, it is entirely possible that some small adjustments or changes in method of operating can be made to suit your particular setup.

There is not too much to be said on this subject other than to repeat "read and follow the factory instructions." If this is done, you will stay out of trouble

and will receive the best performance possible from your popcorn setup.

SUPPLY SELECTION, STORAGE

Years ago it was definitely a real problem to secure a reliable source of raw materials that would assure you of producing a quality product that would be consistent throughout the year. Today the picture has changed and this is not at all true. Our industry has grown to larger propertions and the suppliers of raw materials have grown with it.

The present day suppliers of the materials you need have really gone all out to give the industry consistent quality supplies. Vast sums of money have been spent on developing better grades of corn, new processing methods, improved storage facilities, and many other steps to bring you the highest quality corn at the lowest possible cost. The same thing is true of the refiners who furnish your seasoning, the salt companies who produce special grades of popcorn salt, and the paper companies who furnish the containers for your finished product.

Nor it is necessary to deal with all these individual sources of supply. A fairly large group of reliable popcorn supply companies have grown up with the industry. All of the necessary supplies are available through these established popcorn supply houses. It will pay you well always to deal with only recognized houses. You will be treated right and at the same time save many dollars. It is no longer necessary to gamble on the quality of the supplies you use.

Your entire business is to be built on the quality of your product. Remember, you are not selling a fad or some novel idea, but are handling a food which has developed into one of the most popular confections. You are in competition with other popcorn machine operators. If you are to be successful, you must have a quality product, neatly packaged, and presented to your customers in the best manner possible.

It is impossible to stress too highly the importance of quality. This ties in directly with the selection of supplies, for the quality of the raw materials determines the quality of the finished product. If you keep your standards high, your profits will stay high.

From time to time you will come across "buys" in supplies. Of these you should be extremely careful. In nearly every case you will get only what you pay for. One of the best examples of this that I can think of off-hand is in the purchase of popcorn. It seems as though there is always some corn on the market which is a couple of dollars cheaper than the general market price. Only after you have made one of these "buys" and are actually using the corn do you realize that you are getting a volume of from $10 to $50 less a bag, yet you have used the same quantity of seasoning and salt necessary to pop the best grade of high volume popping corn. That is all right, though; you saved $2 on the bag of raw corn! Does that make good sense?

Enjoy the full profit to which you are entitled—demand top quality supplies!

The care of the supplies is as important as the selection of them; for, if they are not properly stored, you cannot expect to get the best results out of the raw materials or to maintain the quality of your product. Make plans for the proper storage and see that they are followed through. Here are some points to be kept in mind on storage. If you use a popcorn seasoning made of a coconut-oil base, it should be stored at average room temperature. In so doing, the seasoning will be kept in a soft or partially melted stage, making it easy to handle when ready to use.

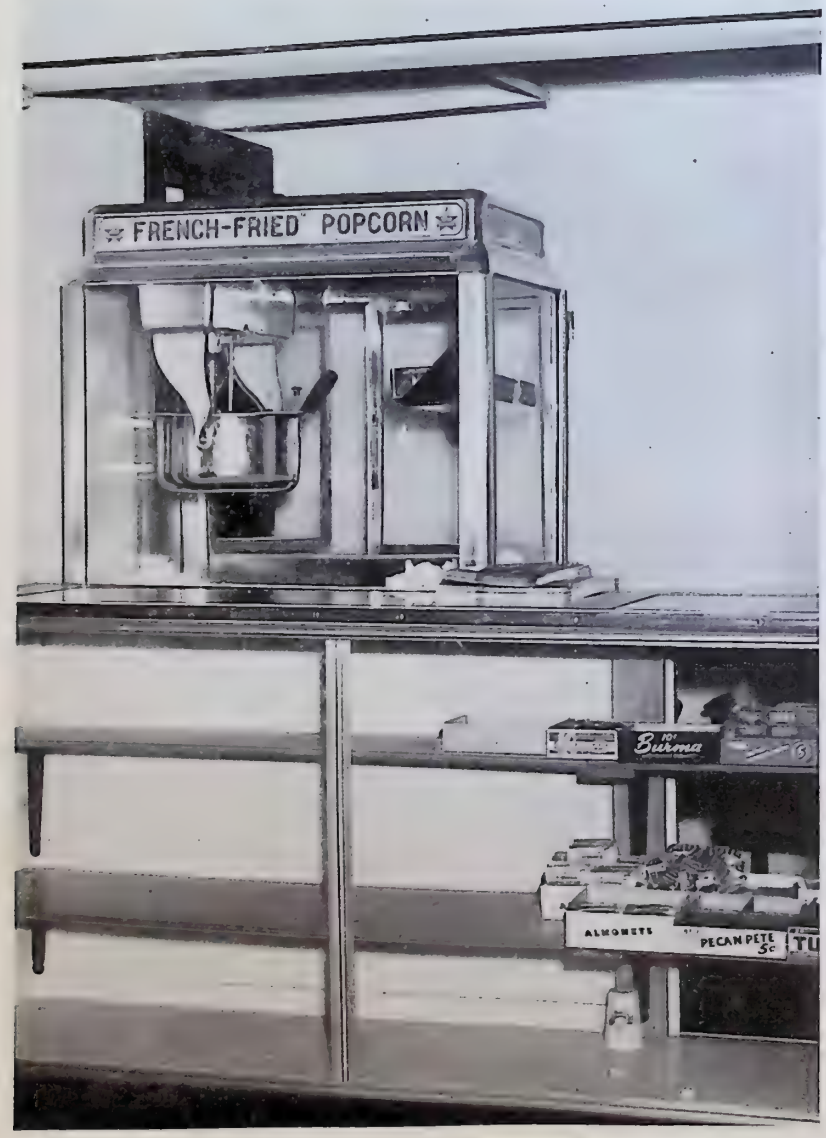
Care should be used in the handling of any other popping oils. It is best to follow the instructions of the refiner in storing these. Some of the oils will turn rancid if stored in warm places over a period of time, especially after having been opened. In any case, know definitely the type of oil that you are using and ask your popcorn supply dealer for his ideas on the best method of storage.

Popcorn salt should be stored in a dry location. The temperature is not of prime importance as long as it is away from humidity.

Popcorn bags and boxes should also be stored in dry location, for high humidity and moisture can easily ruin these. Also, care must be taken to protect these from rodents for they not only can damage the boxes and bags but are possible sources of germs and disease.

There is much to be said on the storing and handling of popcorn. Rather than attempt to express by thoughts on this, I feel that it would be better to incorporate an article published in the May, 1947, issue of the Popcorn Merchandiser, this with the permission of A. J. Villiesse, executive secretary of the

A POOR DISPLAY is shown here, with the popcorn machine set completely in back of the candy counter. Since activity connected with the actual popping of corn is valuable for increasing sales, this handling, when the counter is filled with candies of all kinds, can greatly reduce the sales of popcorn. Candy, of course, should be displayed, but not quite so much at the expense of the popcorn.





AN EXCELLENT DISPLAY of both popcorn and candy, with the two portions of the sales area separated by a small counter for easy handling of popcorn sales. Here the most is made of the activities in conjunction with the actual popping of the corn and an ample display of the popped corn. The orderly display of candy in the showcase, as well as the easily reached assortments atop of counter, help to promote the sales of these items. It is also worthy of note that the theatre has arranged, for the major element of decoration, a 40x60 poster of a coming motion-picture attraction.

National Association of Popcorn Manufacturers.

WHAT'S POPPIN'

"While the manufacturers of popcorn products have recognized the importance of proper popcorn storage in the operation of their business, it is surprising that many of them have treated the matter so lightly. Taking into consideration the advantages that can be obtained by keeping popcorn in good popping condition, it would seem that this should be high on the 'must list' of any manufacturer, large or small."

ADVANTAGES

"Of these advantages, there are two very important ones which equal additional profits. The first is a higher quality product, and the second less popping waste. Therefore, in conjunction with using a correct amount of quality seasoning and popcorn salt, and keeping a check on popping equipment, it is equally important that the manufacturer keep his popcorn in top condition. Just as a poor grade of seasoning or salt will not produce a quality product, popping equipment that is not operating efficiently and popcorn that is not in good popping condition can only result in a great amount of waste and an inferior product. In view of these facts, there is no question of the importance of each factor involved. However, and as current discussion has centered around popcorn storage, it would be well to review that subject and the factors affecting popcorn expansion.

"First of all, let us assume that when a shipment of popcorn reaches your store or plant it is at the correct moisture content and in good popping condition. It is only natural that you make an expansion test when the corn arrives, but how often do you make a similar test? Do you test it regularly before bringing it to the popper, do you condition it if necessary, or do you pop out a hundred pounds or more and then discover that the corn is not popping as well as it did when you received it? If this is the case, and unless you don't mind losing a lot of money, it is about time you started to do something about it.

ARE YOU DOING THIS?

"1. Do you check the moisture content and popping volume of the popcorn when it is delivered to you?

"2. Do you store it in a cool, dry room where it is in contact with natural atmospheric conditions?

"3. Do you keep it off the floor to allow air to pass under it as well?

"4. Do you store it in a vermin proof room?

"5. Do you keep a continual check on its popping volume?

"6. Do you bring it to your popper in the best of condition?

EXPANSION VS. TENDERNESS

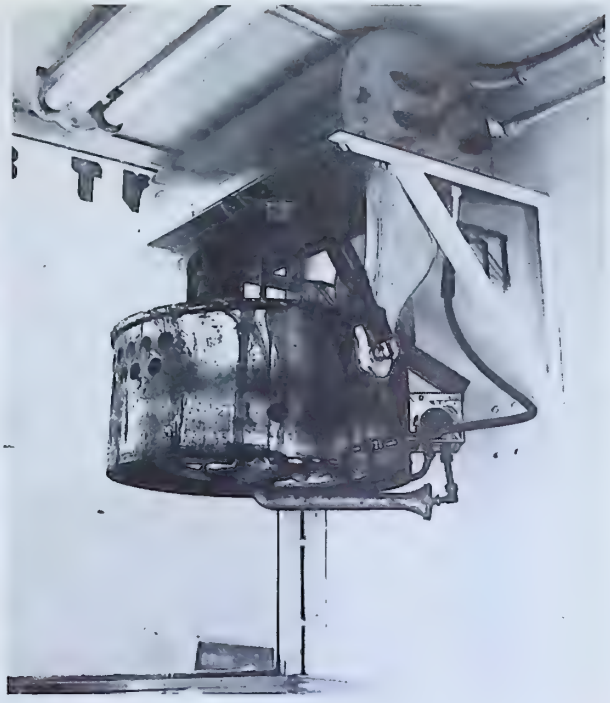
"To commercial poppers large and small popping expansion is extremely important. Important from the standpoint that a large expansion during popping is closely associated with tenderness. It also means a greater volume of the finished product from a given amount of popcorn. Therefore, it is apparent that popcorn must be kept in good popping condition to get the desired results.

OTHER IMPORTANT POINTS

"In conjunction with the proper handling of popcorn, there are other factors equally as important. These apply to the



FROM WHICH WOULD YOU BUY POPCORN? If the popcorn machine operator will just ask—and answer—this question for himself, he needs not to be constantly reminded that he is handling a food—and food handling is controlled by strict provisions of pure food laws and health authorities.



It is a reasonably easy matter to keep a popcorn machine clean and free from grease and salt—if the task is done regularly and immediately after oil has come in contact with the metal. And always keep the area around the machine free from kernels and popped corn and other trash.

heat of your popper, its capacity, seasoning, salt, screening and packaging.

ARE YOU DOING THIS?

"1. Do you check your popping equipment daily?

"2. Do you clean your popping equipment daily?

"3. Do you load your popper with the right amount of corn?

"4. Do you use a good grade of seasoning and popcorn salt?

"5. Do you use the right amount of seasoning and salt?

"6. Do you screen the finished product adequately?

"7. Do you package it properly?

"If you can answer all of these questions in the affirmative, then you are on the path to quality. Yes, the path to increased sales and increased profits.

TEMPERATURE—HUMIDITY VS. MOISTURE CONTENT

"Relationship between temperature and humidity, regarding the moisture content of popcorn in storage with free circulation of air.

Temperature (Degrees Fahrenheit)	Humidity (Per Cent)	Moisture Content (Per Cent)
20	54	12.5
	56	13.0
	60	13.5
30	57	12.5
	61	13.0
	65	13.5
50	62	12.5
	66	13.0
	69	13.5
70	65	12.5
	68	13.0
	71	13.5
78	41	9.2
	53	10.6
	69	12.6
	77	13.5
	92	17.5

"It is generally agreed that the ideal moisture content of popcorn should be from 12.75 to 13.25 on hybrids, and from 13 to 13.5 on the average open pollinated corn.

SUGGESTIONS ON RECONDITIONING POPCORN

"Most people know that it is possible to condition popcorn if it has become too dry to pop well. Here are a few suggestions for doing the job.

"1. Where a small amount of corn is to be reconditioned, it can be placed in a tight container and water sprinkled on top, and the lid closed. It is imperative that the lid be taken off within 24 hours to prevent molding.

"2. Treating of larger quantities where a heated room is available. Get the temperature to 80 or 90 degrees if possible, closing the room up tight and spraying water into the air or onto the sacks. Again it will be necessary to turn fresh air into the room within 24 hours.

"3. A low moisture corn can be blended with high moisture corn and it will uniform itself in 10 days to 2 weeks, depending on the weather conditions.

"4. Corn can be dipped into water and immediately poured out thin on a floor to dry."

QUALITY OF PRODUCT

Under the section, Selection of Supplies, we hit fairly well on the quality of the product. This was mainly because of the fact that raw materials are of such extreme importance in the final quality of the product.

Many pages could be written on this subject for the popcorn business is no different from any other—except in one respect and that is the margin of profits.

In everything you buy, whether for personal needs, office supplies and equipment, production equipment — in fact, just everything—you look for one thing and that is for the best quality product at the lowest possible price.

Now the position is reversed, you are selling instead of buying, but your customers are buying and they are looking for a quality product. Keep that in mind for that is your secret for repeat business.

Popcorn can be a profitable business. There is a larger margin of profit here than in nearly any other food product. You have more than enough margin to give your customers quality for it costs you nothing. By securing the best supplies, you not only have a quality product but as a general rule you increase your profits through greater expansion.

Screening of the corn is of the utmost importance. Don't worry about the amount of waste corn in the corn pan as long as you are receiving satisfactory volume to the pound of raw corn. You must be sure, however, that your operators are not selling the old maids or scorched kernels. No one likes these and it will tend to kill your repeat sales.

Do everything possible to put out a product of which you are personally proud. See that the product is sanitary, raw supplies of the best possible grade and that nothing is done in the handling

of the corn to reduce the quality in the slightest degree.

Above all, don't cheapen your product by attempting to buy inferior materials.

MERCHANDISING OF PRODUCTS

The importance of quality in the product has previously been stressed and now I want to stress the fact that even though you have a quality product it still must be sold. Remember, you are setting yourself up in a sound business and to successfully operate it you must have sound merchandising plans.

I believe that without a doubt a large majority of popcorn machine operators will agree with me on the following statement: "The two best popcorn sales stimulants are the actual sight of popping corn and the delicious aroma given off the corn during the popping procedure." At least this has certainly been true in my experience and in every installation of equipment that I have engaged in a point has been made to capitalize in every possible way to secure these full benefits. The results have been profitable.

Cleanliness is of vital importance. The equipment and stand, as well as the operators, should be kept spotless. If your operation is immaculate, the product must be good. The psychological affect the customer receives in looking at such an operation greatly increases his appreciation of your product.

Much consideration should be given to the packaging of the product. It must be neat and attractive, the quantity must be of fair value and it must be presented in an appealing manner to the customer. The advertising space on the bag or box is frequently used as a medium to boost the product and to advertise a business that is run in conjunction with the popcorn operation. In every location there is always the possibility of capitalizing on this feature.

Another point to be stressed is the display of unpackaged corn. Be sure that the display is always adequate, and that it is free of old maids and scorched kernels. That it is piled neatly against the glass of the display cabinet to give the best possible outward appearance. Unsightly accessories should be kept away from the unpackaged product. Create no idea that the corn is not perfect in every respect.

Salesmanship at the point of sales by the operators cannot be stressed too highly. No one likes to have things thrown at them, especially when they are paying good money for the product. Courtesy and a smile by the salesperson will send your customer away happy—and ready to come back for more. Then, too, a right word at a right time can many times change a 10-cent sale into a 25-cent one. Is this not worth trying for?

If you maintain a display of packaged merchandise—keep it neat and change it frequently. This way your regular customers won't feel that they are buying the same old thing all the time. They welcome a change, it draws their attention and keeps them coming.

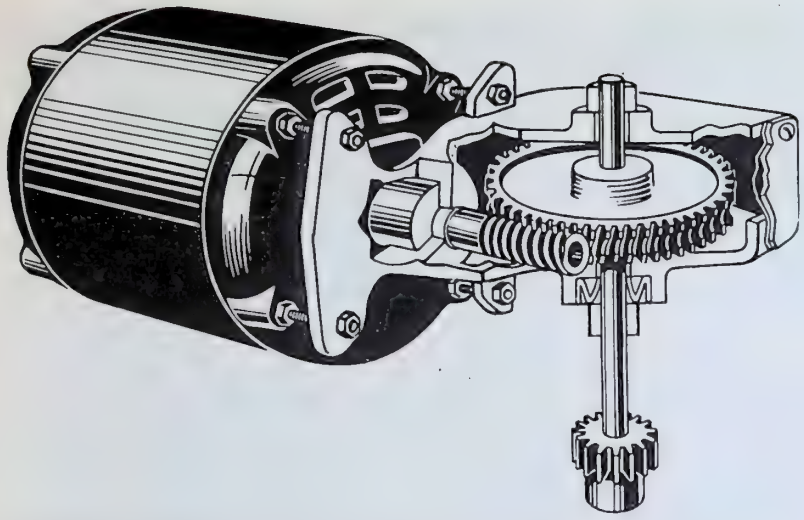
Watch your operations carefully at all times. By studying them you can secure new ideas for improving your setup and create a more attractive display. Remember, it is your business—you will get out of it only in proportion to what you put into it.

MAINTENANCE OF EQUIPMENT

Popcorn equipment is no different than your automobile, your projector, or any

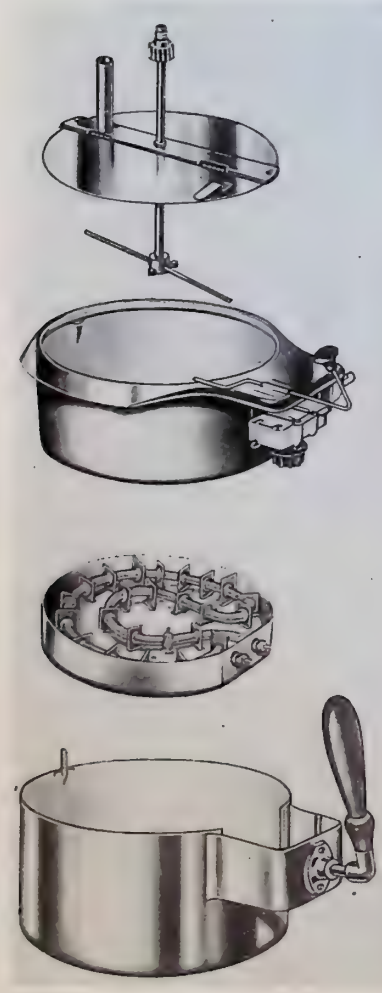
ANOTHER EXCELLENT DISPLAY is here depicted. Here the service part of the counter has been eliminated, but a new feature was added: the warm-storage space for boxed popcorn to the left of the popper. With this added facility, the attendant can always have on hand a supply of corn already boxed to help speed up service when the customers start to mill around the area. This candy display features the display of the items in the original cartons. The decorative scheme of the rear wall, whether by accident or design, offers an interesting group of Disneyesque denizens of the forests.





THE GEAR HEAD MOTOR shown here is a cut-away section, showing the arrangement of the drive gears. Since the drive gear is of brass and the gear housing is sealed, with the proper amount of grease, no maintenance is needed unless there is a failure which would necessitate the dismantling of this sealed housing. No grease should, under normal conditions of operation, be required for many years.

THE KETTLE ASSEMBLY, completely dismantled, shows, from top to bottom, the agitator assembly, the kettle casing, the heating element, and the outer kettle shell. No maintenance is needed.



other mechanical product. It will and does require maintenance, in proportion to the amount of use it is given.

Regular, thoughtful maintenance from the time the machine is first put into operation will save many dollars in expensive repairs later. Not only that, but it will give you a more attractive machine throughout its lifetime and will help you avoid those expensive breakdowns just when you need the machine the most.

Again, reference is made to the instruction sheet that came with the machine. Study this carefully and note particularly the recommendations of the manufacturer as far as maintenance is concerned.

So that we will have a better idea of what we are up against on this, let us look at one of the average popular machines on the market and see just what parts may require attention from time to time.

First, take the cabinet of the machine. We find that it is constructed of stainless steel, Monel, chrome-plated steel and glass. To preserve the finish on these, a regular cleaning program must be instituted—not semi-weekly or weekly, but daily. See that the machine is cleaned and polished thoroughly every night after your operations are finished for the day. In the operation of the machine, you are using oil and salt as raw materials and this combination when coming in contact with metal has a tendency to set up a corrosive action; so to assure long life for the materials the machine must be kept clean.

In the cabinet also we find two mica heating elements under the corn pan, controlled by a two-heat switch. The purpose of these elements, of course, is to keep the corn pan at the correct temperature to properly heat the popped corn. No maintenance of the elements is required, although eventually it may be necessary to replace them or possibly replace the switch. Failure of the elements can be determined by lack of heat on the corn pan.

At the top of the machine the only electrical feature is the lighting arrangement. No maintenance here except for replacing light bulbs as they burn out.

The entire popping unit is being shown separately, in order to list the various parts for your convenience.

(1) Motor housing—Inside the motor housing we find the gear head motor (D). From the cut-away view, we can see the arrangement of the drive gears. Since the drive gear is of brass and the gear housing is sealed, with the proper amount of grease no maintenance is required unless there should be a failure that would necessitate the dismantling of this sealed housing. No grease should have to be added for many years.

The motor itself, however, should be oiled at regular intervals, approximately every three months, depending of course on the actual number of hours it is in operation.

Also, on the front of the motor housing, we find the various control switches —kettle, motor, lights and warmer. Back of these, within the housing, is located the electrical terminal block (E) from where the main power supply is distributed to the various outlets throughout the machine. The main thing here is to see that all connections are tight and that if it should be necessary to disconnect any of the wires, to see that they are replaced exactly as they were removed.

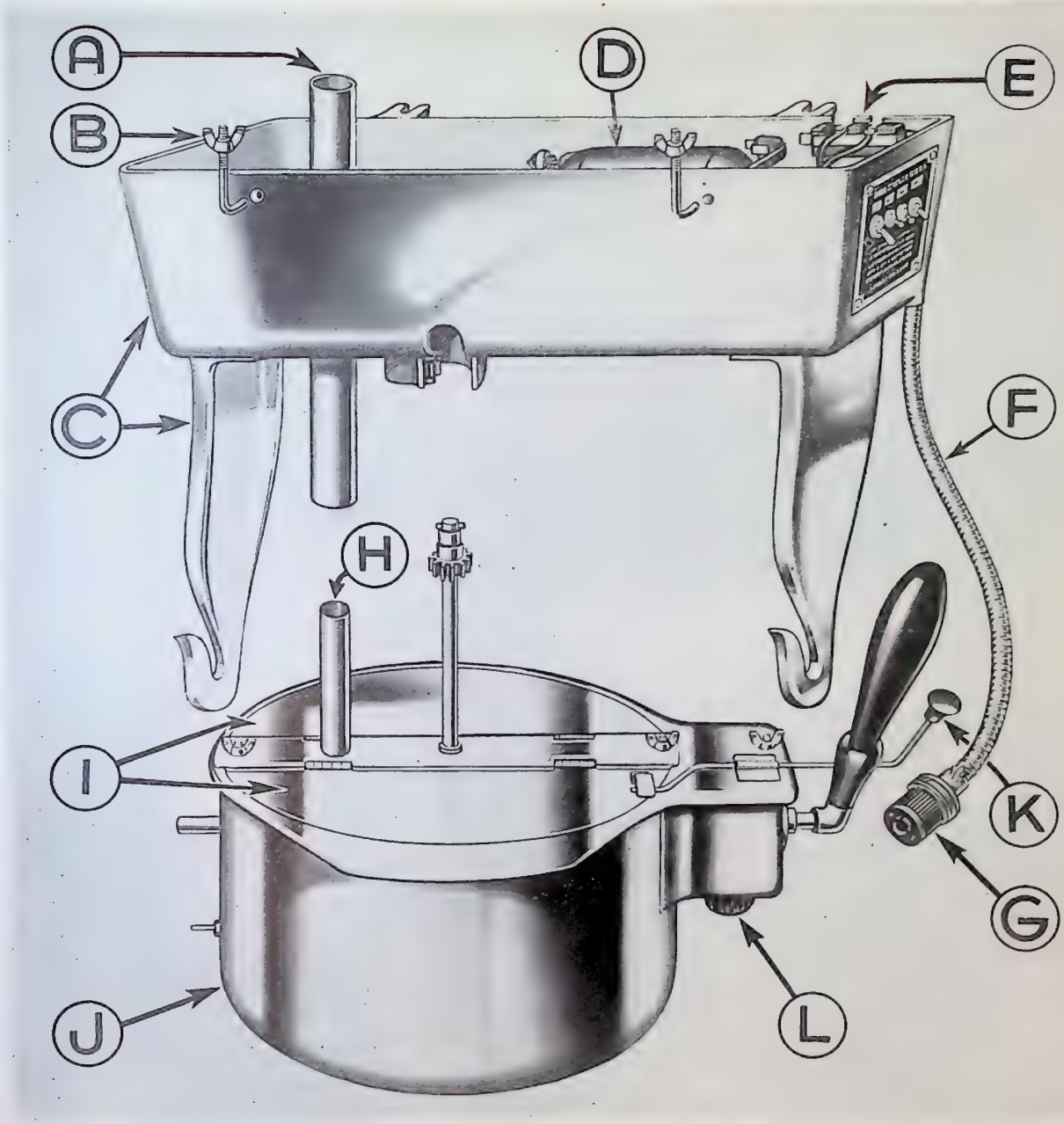
One caution is to keep the wires as free as possible from a collection of grease and dirt.

From the motor housing are suspended the hanger arms (C) from which the kettle is supported. In removing the kettle, or in servicing the machine, care should be taken to see that these are not sprung or thrown out of line in any way; for if this should happen, the kettle would not be supported in the proper position to align the spur gears on the agitator shafts.

(2) Kettle Assembly — The agitator spur gears should be lightly lubricated occasionally with a solid heat resistant grease (very little is required). The important factor here is to see that the needle bearing on top of the lower spur gear is kept free from hardened grease and dirt. This must turn freely to permit the proper engaging of the gears.

The kettle, completely dismantled, is also shown. As you will see, there are four distinct sections to this—the kettle agitator assembly, kettle casting, kettle element, and the outer kettle shell. No maintenance is required for these. Eventually it will be necessary to replace the element. This is simply done by removing the two thumb screws and two hex-head bolts and disconnecting the element wires from the element terminals. The new kettle element can be installed and the entire unit reassembled with little difficulty. One caution, however, is to use care in handling this assesmbly so that the themostat is not damaged in any way. This themorstat is a fragile mechanism and must be handled with care.

One of the prime factors on the kettle assembly is to keep it clean. If the operator of the machine will keep the kettle lids and kettle shell wiped off occasionally during the popping process, it will not be a difficult job to give it a thorough cleaning at night. However, if the grease



REGULAR, THOUGHTFUL MAINTENANCE, directed at the particular points indicated, will save many dollars expensive repairs. Not only that, but it will give you a more attractive machine throughout its lifetime and will help you avoid those expensive breakdowns just when you need the machine the most. Reference should be made to the instruction sheet that came with the machine. Note particularly the recommendations of the manufacturer as far as maintenance is concerned. Particular attention should be paid the gear head (D), terminal block (E), and hanger arms (C).

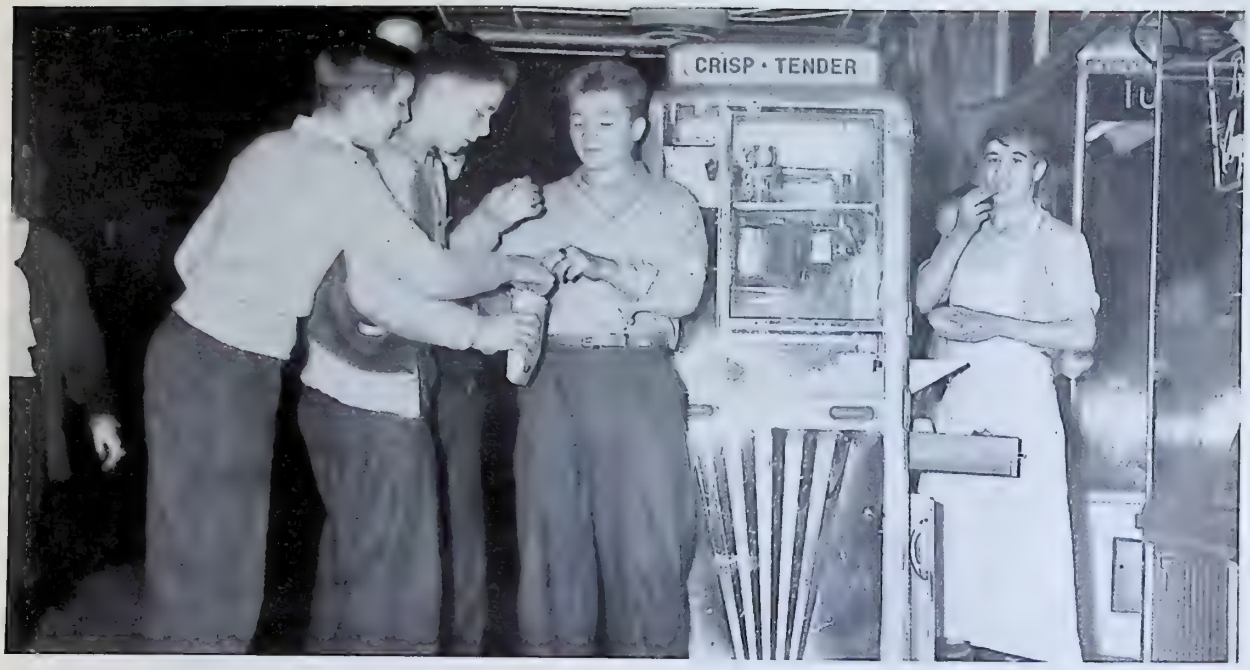
and salt are left on to harden and to accumulate, it will be extremely hard to remove without damaging the surface of the steel. Abrasive cleaners cannot be used in connection with chrome steel for they will scratch and mar, destroying the protective chrome surface and also the appearance. By keeping the machine wiped off, ususally a cleaning with Bon-Ami at night will be sufficient to keep the unit perfectly clean and highly polished.

(3) The interior of the kettle casting can be kept clean by wiping out thoroughly immediately after you are finished popping, while the kettle is still hot and before the oil and salt have had an opportunity to start to carbonize. If a coating of carbon should start to build up on the inside of the kettle, a rough abrasive may be used with good effect in removing the carbon.

SANITATION

We again remind you that you are handling a food when you are handling popcorn and that you come under the regulations established by pure food laws and health authorities. Operating a popcorn machine in a sanitary manner cannot be stressed too highly.

It is a reasonably easy matter to keep a popcorn machine clean, free of grease and salt, if the task is done regularly and immediately after the oil has come in contact with the metal. If, however, the oil is permitted to stay on the metal the heat will cause it to carbonize, making it next to impossible to clean. This



EVERYBODY HAPPY? The popcorn business is no longer in its infancy, but has established its place with the industries of the world. Although it has been built up in the United States, it is fast becoming an international food. Take time out to learn your business and see that your own particular operations meet the high quality and cleanliness standards that a top-ranking food product deserves. Popcorn is big business, a growing business, a sound business, and a profitable business. Let us all work to keep it that way! And then everybody will, indeed, be truly happy.

also creates a very unsightly and unsanitary condition. No one likes to eat food from any equipment that appears to be unsanitary; so set up a regular cleaning program and see that your employees follow it religiously.

The personal appearance and personal sanitation habits of the employees handling popcorn are certainly important. Keep the employees in clean uniforms, see that their general appearance is neat and that their personal habits are clean throughout.

In the rush of handling a popcorn business there is a tendency to become careless and negligent in cleaning habits. Oil, kernels of corn, and popped corn many times are scattered about the machine and around the floor where the operators are handling the materials. This creates a very poor appearance and is not at all necessary. If something is spilled, it certainly should be cleaned up immediately. This all adds to the appearance of your stand and to the all important customer impression of your operation. Remember, you must keep them sold on the idea that you are serving a clean, healthful food.

FIRE AND SAFETY PROBLEMS

In previous sections of this article, I have urged you to give thought to the regulations set out by the local fire department and to safety of operation. Since this is an important factor in your setup, I want to call your attention to it in an entirely separate section.

Modern popcorn machines of reliable manufacture, like home gas or electric ranges, are not definite fire hazards or unsafe machines to handle, but common-sense thought must be used by the operator, for after all they are a mechanical piece of equipment utilizing heat and power.

The operators of the machines must be trained in the use of the equipment. It must be impressed upon them that foolish acts can cause trouble and damage. The average manufacturer has taken every precaution to guard against such possibilities, but all the time, trouble and money spent by these manufacturers on this phase of the design of the machine is in vain if the operators do not handle the equipment as the manufacturer has instructed.

There are several precautions that should be taken and I will list a few of these:

Train your help thoroughly and accurately in the operation of the equipment.

See that all electrical wiring is installed under fire code recommendations and that there is no possible chance of wiring failure that might cause a fire.

Instruct your operators thoroughly on what to do in case of a fire, such as turning off or disconnecting the main power supply, the use of fire prevention equipment, instructions on your regular fire prevention policies or procedure in case of a fire.

It is also well to stress safety in operation. Many small accidents can be eliminated by bringing out this point with the operators. See that cans of raw materials are not placed in the working areas, oil spilled on the floor immediately cleaned up so that there is sound footing, and many other little precautions that not only add to the safety of the operation but improve the general cleanliness of the stand and the efficiency of the entire setup.

OPERATING PERSONNEL

Your operating personnel are your salesmen. In them you vest nearly the entire success of your operation. To put in new personnel without the proper training means a poorer quality product, lowered health, safety and fire standards, and poor salesmanship in presenting your finished product to the public.

When it is necessary to break in a new person, spend some time with him; teach him the entire operation as you know it—not only how to run the machine but how you want your product merchandised and how you want it presented to your customers. It is unfair to expect a person to do a new job successfully without training, and the operation of a popcorn stand is no exception to this rule. Devote time to this factor of your business and it will pay you off in increased sales and profits.

SUMMARY

Throughout this article I have tried to stress the fact that the popcorn business is no longer in its infancy, but that it has established its place with the industries of the world. Although it has been built up in our United States it is fast becoming an international food.

Those of us that have taken a place in the industry should be proud of this place and should do all we can to make our industry continue to grow.

Take time out to learn your business and see that your own particular operations meet the high quality and cleanliness standards that a top ranking food product deserves.

We repeat, popcorn is big business. It is a growing business. It is a sound business. It is a profitable business. Let us all work together to keep it that way!

The Vending of Soft Drinks in Theatres

Smart Appearance and Patron Convenience Give Automatic Cup Dispensers Preference

JOSEPH W. RILEY
The Charles E. Hires Company

Declining box-office take is said to be leading theatre owners all over the country to show a renewed interest in selling soft drinks, candy, and cigarettes through vending machines and sales counters positioned in their lobbies or lounges. With today's high costs making it almost impossible for them to operate their houses profitably, theatre men look to this extra equipment as a means of additional revenue, and the average manager is rapidly becoming convinced that such items are a definitely needed addition to his house that pay off in increased accommodation to his customer as well as increased income to his coffer.

In offering carbonated beverages to motion-picture patrons, it is important that nationally known brands of the highest quality be sold. If a familiar name or trademark appears on a vending machine it rings a bell in the prospective customer's mind that this is the spot to buy refreshing enjoyment.

"QUALITY OF PRODUCT . . ."

The "impulse factor" of buying attracts more customers to vending machines than any other reason. It is a definite misconception that the public will buy anything if it cannot get what it really wants.

In a great many cases people will not buy if they do not recognize the product, which results in lost sales. It has been proved time and again that the use of nationally advertised quality products increases sales out of proportion to the savings obtained by using cheap inferior merchandise.

Companies, such as Hires, have spent millions of dollars to educate the public to look for and to recognize quality, thus it is only natural that theatre owners would want to sell the best products available as it means increased profits through more sales.

COUNTER SALES

Experience has taught theatre men that an attractive, well-stocked conces-



THE AUTOMATIC CUP DISPENSER (left) of 1,000-cup capacity stands 6 feet high and occupies an area as small as 3 feet by 2 feet. But size is generally considered secondary to appearance. It is all to the best if the machine can tie in with the decor of the theatre, but in any event it should be neat and well-kept. A good-looking, clean machine is an asset to the lobby, and an invitation to customers to buy drinks.

THE SMALL SODA-FOUNTAIN UNIT (below) is self-contained and manually operated. Diagrams of this machine are given in a later illustration. The machine is particularly adapted for use in connection with a candy counter, where the attendant also draws the 6-ounce drinks that, of course, may be served in paper cups instead of the traditional Hires glass as shown. Installation of the equipment is easily accomplished.





THE MOST SUCCESSFUL cup-vending machines are considered to be the dual-flavor dispensers, such as this machine manufactured by C. C. Bradley and Son, Inc. The arrangement has special advantage for the large-volume situation, for, besides giving a choice of drinks, one side is always available should the other be out of order. The two sides are separate, even though flavor may be the same.

sion counter can outsell any vending machine, except the beverage vendor. For several reasons—usually wider selectivity, better display, as well as personal attention — the average theatre patron seems to prefer to buy his candy from a counter rather than a machine. But the reverse is generally true of the soft drink vendor. This machine handles beverage sales more quickly, more efficiently than would be possible to sell bottles over a counter.

However, both types of operation can be used simultaneously, if so desired, one supplementing the other. The merchandising machine, operating at all times, can accommodate off-hour patrons when the counter might conceivably be closed.

A small self-contained soda fountain unit, which is capable of dispensing 250 to 275 six-ounce drinks an hour, has recently been developed by the Charles E. Hires Company. This machine, serving drinks in paper cups, is manually operated. To my belief, this equipment makes an ideal tie-in with candy counters, as it can be operated by the attendant selling other merchandise, which means a saving in labor — as well as in space. The machine requires an area of only 19¼ inches deep, 24½ inches wide, and 56⅞ inches high. Installation of this unit is relatively easy. Conventional type electrical outlets can be used, a water supply piped in through the regular plumbing system. The draining problem is slight, as provisions have been made for a waste bucket in case of excess water. Units are equipped with hermetically sealed compressors in order to meet various fire ordinances. Handling of the product is comparatively simple, with no bottles or ice to handle.

Installed and operated in conjunction with the candy counter, this type unit should prove a profitable piece of equipment to the theatre owner. Cost of serving a drink through a manually controlled machine in paper cups is considerably less than serving the same drink in a bottle. Excluding charges for labor, it usually costs 3 1/3 cents to serve a drink in a bottle, making 1 2/3 cents profit over ingredient costs on each 5-cent sale; while the cost of serving the same size drink, including the cost of paper cups, through such a self-contained unit, would be approximately 1½ cents, or a profit of 3½ cents on the nickel sale. Both these sets of figures are based upon actual product costs.

Recently, a major beverage company installed a super sales counter in a New York theatre. Specially designed by the theatre's art director, this counter, handling only bottle goods, was set up to manage the sale of 8,000 drinks a day. It has five built-in refrigerated cabinets capable of holding 1,500 bottles. However, it is my opinion that efficiency in selling carbonated beverages in bottles in theatres is greatly difficult to attain because of excess handling of the product.

CUP VENDING

It is rather difficult to obtain actual sales volume of the number of drinks sold through cup vendors, but from data that we have been able to gather, the average cup dispenser sells between 4,000 and 5,000 drinks a week. In certain large theatres, depending upon the picture playing and also upon the weather, cup-vending machines have been known to sell 5,000 drinks in a single day.

To do the most good, the vendor should be placed in a prominent position in the lobby, or lounge, or wherever traffic is heaviest. It should be well forward so as to be easily accessible to patrons.

In large lobbies the space that the machine occupies is, of course, of little importance. However, a 1,000-cup machine, standing about 6 feet in height, will on the average occupy an area as small as 3 by 2 feet.

But size, in the opinion of most theatre managers, is secondary to appearance. It is all to the best if the machine can tie in with the decoration scheme of the theatre, but in any event it should be neat and well-kept. A good-looking, clean machine is an asset to the lobby—and an invitation to the customer, which means better business for the manager.

Cup-vending machines are installed on a percentage basis. The operating company puts in the equipment at his own expense and makes the necessary arrangements for water and electric supply. It is his responsibility to keep the machine operating at all times and to keep it well stocked. Generally speaking, this means servicing at least once a day. It is also his responsibility to keep the equipment clean—although, in some cases, theatre managers cooperate by having their janitor dust the machine in his daily round of housecleaning other theatre equipment.

In theatre locations there is a limited amount of pilferage or abusive treatment to the machine, because of the constant presence of theatre attendants, so that operators are able to pay commissions from 20 to 25 per cent of the gross intake, based upon the number of drinks sold.

Installation of cup-vending equipment is relatively simple. The machines are compact in themselves, as the unit is really a self-contained soda fountain with a mechanical coin and a cup-dispensing device enclosed in a steel box. They can be installed almost anywhere in the theatre, as arrangements can be made to use the conventional type electrical outlet and a water supply can be piped in. Draining is really no problem, provision being made inside the machine in case of excess water.

Especially attractive to theatre owners is the fact that the firm installing the equipment bears all the expense of installation, as well as servicing, and the only responsibility of the theatre is the protection of the equipment from abuse.

Generally the machine operates on regular 110 volts a. c. — just about as simple as plugging in the radio or a floor lamp. The cord, of course, is considerably heavier, because it is carrying a bigger (cooling) load, but no special wiring is required.

In some cases, water is furnished by the company in tanks, but generally is piped in through regular plumbing lines. Carbonated in the machine, the water is cooled in a supply tank, which makes for speed of delivery, so that when a customer puts his nickel in, the cooled carbonated water mixes with the cooled syrup and pours out into a six-ounce cup, ready for drinking, in a matter of seconds.

The latest cup-type vendors, with a capacity of more than 41½ cases of bottle drinks, require but one servicing daily. This may take the brief time of 10 minutes, and the machine is back in business with its tremendous capacity refilled, ready to serve the next customer, without waiting for a cooling period. These vendors are designed for peak production, and fill the bill in a theatre location with large volume, where speed of delivery is essential.

According to our information, the most successful cup-vending machines operated in theatres today are dual-flavor, offering Hires and another drink. This arrangement has a special advantage for the large-volume location, which theatre

managers appreciate, for besides giving the customer a choice of drink, the dual-flavor machine also enables the customer to have at least one kind, should the other side of the machine be temporarily out of order, since each flavor is a separate unit.

CUP- VS. BOTTLE-VENDING

Up to this point we have been discussing primarily the cup vendor, as being the most suitable arrangement for theatre lobbies. But in order to cover the ground thoroughly, let us consider a comparison of the cup and bottle vendors.

As we have mentioned, the outstanding advantage of the cup machine is its capacity. Some machines carry as high as 1,200 individual servings. This would, of course, cut down on servicing. Also contributing to less frequent servicing is the fact that most machines can use the local water supply, drawing it from local pipe lines, then carbonating and mixing it with the syrup in the machine. Finally, paper cups can be more easily disposed of than bottles. A handy waste receptacle standing beside the vendor will easily take care of crushed paper cups, keep the lounge or lobby in order.

Incidentally, there seems to be a real fascination—for adults as well as children—in watching the cup drop and the liquid fill it automatically to just the proper height.

We might mention here, also, that 60 per cent of vending machine sales in theatre lobbies are made to children—a factor to be considered when selecting your merchandise.

In the pre-war period, failure to dispense a uniform drink and the problem of sanitation were the chief criticisms of the cup vendor. But today most machines on the market have taken care of the mixing problem satisfactorily and are further equipped with ultraviolet-ray lamps to sterilize the product as it enters the cup. Tanks and fittings are of stainless steel, for the most part, and readily accessible for cleaning and replacing. Water purifiers and filters have been installed.

In some cases, where the water is piped in from the local supply, there is a chance of variance in the finished beverage. Water, of course, varies from one place to another, depending on the natural alkalinity of the supply and on the chemical disinfectants used by the municipality. In spite of technical improvements, it is sometimes difficult, under some conditions, to insure uniformity of the drink.

The bottle vendor, on the other hand, has a relatively small capacity—up to 300 bottles. In as busy a location as a theatre, with its crowds of patrons, this machine would have to be serviced several times a day. Theatre managers would hardly care to be having machines serviced in the lobby during the show.

Considering some of the advantages of the bottle vendor—if capacity were not at stake—this is a comparatively simple mechanism. The customer inserts his coin, pulls a lever, and the bottle slides out. With this operation there is only a very slight possibility that anything can go wrong, causing any ill-will for the bottler or the operator. As for the beverage, it is uniform, constant, sealed.

To the bottler, the chief problem of the bottle vendor is breakage and the loss of "empties," so to counteract this loss, most location commissions are contingent upon the return of "empties" to the bottler, who deducts two cents for each one missing.

To the theatre man, because appearance of the lobby is so essential, the question of empty bottles—and the space in which to keep them—becomes the important factor.

Also important, in most opinions, is the cost of the bottles and the subsequent loss if some of them get broken or mislaid—which can lead to tension or argument all along the line.

In the bottle vendors that have reached the post-war market there have been few radical changes, except for larger capacity and a trend toward circulating dry cold air refrigeration. The addition of built-in change-making devices, which accept dimes and quarters and give the right change, has boosted sales 25 per cent in some cases—which is also true of cup-vending equipment.

In general, each type of machine has its merits and its application, and there is a definite place in the market for both kinds. However, bottle vendors appear to be better suited for locations where the expected volume of business is comparatively small, such as offices and gas stations, while cup vendors, with their greater capacity, seem better suited for locations where there is more traffic and greater volume, as would be expected in theatres.

SUMMARY

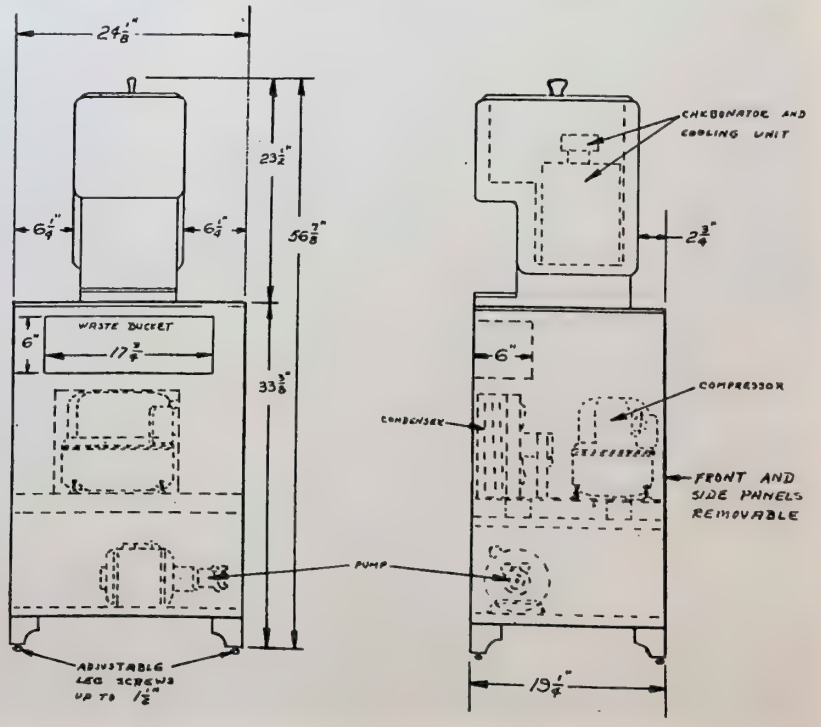
In summing up, the sale of carbonated beverages, whether by cup or bottle or through a manually operated dispenser, has come to represent even now a sizable profit item in the operation of the modern motion-picture theatre.

The future of selling carbonated beverages in theatres, however, depends solely on the profit derived for the owner. He is in business to make money, and the company which offers dispensing equipment that is mechanically efficient, easy to maintain, attractive in appearance—serving a nationally known drink, properly chilled and perfectly proportioned—will help him make it.

Earlier vending machines fell out of favor to some extent because of faulty servicing, freaky operation. But in the past few years great effort has been put into making the vending machine attractive, streamlined, friction-free. Their smart clean appearance, easy operation, comfortable convenience — plus sizable profits—make them a desirable asset to any theatre.

With the growth and development of automatic merchandising equipment, managers have a choice of either bottle- or cup-vending machines. In general, the cup machine seems to be preferred for theatre locations, its chief advantage being its greater capacity—besides greater profit possibilities and the lack of nuisance associated with the handling of bottled goods. Capacity is a big factor in theatres. With an average of 110,000,000 patrons a week in the 18,197 motion-picture houses in the country, the theatre vendor must be able to take care of large volume — with the least amount of trouble to both theatre owner and customer.

SCHEMATIC DRAWINGS of the self-contained cooler, carbonator, and manually-operated dispenser unit, shown in an earlier picture. The Hires-developed unit can dispense 250 to 275 six-ounce drinks an hour. Shown in the drawings are the carbonator and cooling unit, compressor, condenser, water bucket, and removable front and side panels, along with the dimensions of the unit's several parts.



The Cinema—New Potential for Soft Drinks

Discussion of the Operation and Management Of Bottle and Cup Vendors, Soft-Drink Bars

JOE B. ALFORD
Dr. Pepper Company

A new type of outlet for the sale of soft drinks which is being rapidly developed and one that promises unusual potential and sound profit is the American movie-theatre lobby. In view of the millions of people who patronize the movies weekly, this new point-of-sale, for a number of obvious reasons, appears to be a natural.

With the development of new-type automatic bottle and cup vendors, which are now showing up in the trade in ever-increasing numbers, theatre owners are finding soft drinks highly popular among their patrons and profitable to their operation. Pioneering work in this new market is now going forward in national, regional and local circuits. The soft drink industry, along with canteen service and beverage companies, is working in conjunction with theatres to develop this new outlet to its great potential.

In both bottle and cup vendors, Dr. Pepper has been served in many various types of outlets for a number of years and the company has done considerable research in this field. The present expansion of retail outlets in the soft drink field is the result of the concentrated drive by the industry to establish availability and distribution. Soft drinks can be served to the theatre-goer through bottle vendors, cup vendors or over-the-counter service. The method used in serving customers will depend largely on the size of the theatre, size of the audience, amount of space in lobby or foyer and the amount of investment the theatre management wishes to put into the project.

The location of the dispenser or bottle bar is important. It is usually determined by the size and layout of the lobby, the location and size of lounge rooms and the anticipated volume of business that will result. The sale of soft drinks in the theatre lobby will be affected by the location of the unit. It should be in a conspicuous location, easily accessible to all patrons, yet it should not block entrances or exits. Above all, dispensing units should be serviced often, kept clean and inviting to the customer.

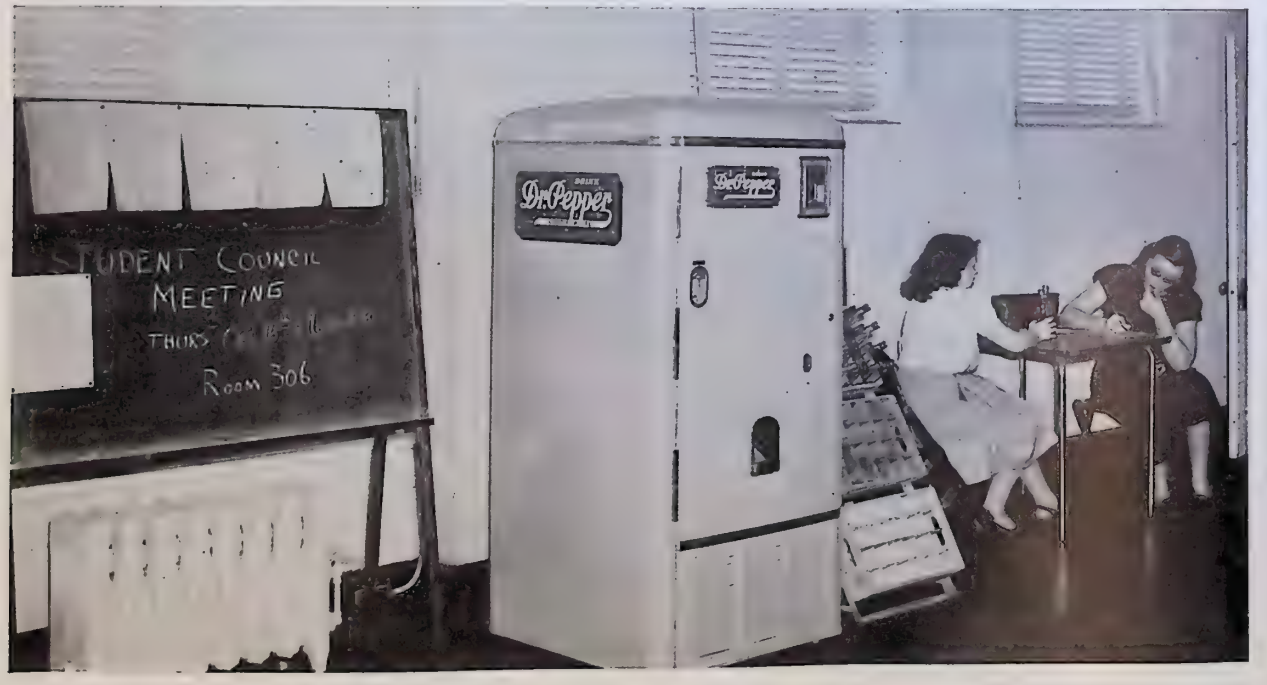
Soft drink outlets in theatres offer great potential because they suggest an added pleasure to the patron who is there for the prime purpose of enjoying himself. Like the theatre itself, soft drinks have become an American custom and this new association of the two presents an ideal combination.

BOTTLE VENDORS

Bottle vendors are responsible for the major portion of the soft drink business and are ideal for use in serving theatre patrons. The larger units have a capacity up to 242 bottles, which is an adequate supply for one evening's run on the average neighborhood theatre. In the larger theatres, however, these units would require refilling during the course of the performance.

The primary advantage of the bottle vendor and of the bottle bar is the guarantee of serving a uniform, quality product made according to standards established for the product by the manufacturer. The Dr. Pepper Company places great emphasis on the importance of serving a perfect product. A control laboratory is maintained in its home offices in Dallas where strict measures are used to check the quality of Dr. Pepper throughout the entire territory where the product is sold. Field men send in samples taken from the trade at regular intervals for analysis and immediate steps are taken to correct any slight variance from the product standards. This same procedure is followed by other

A BOTTLE VENDOR of an excellent type which is highly adaptable for use in theatre lobbies is the one pictured here. Located in the lobby of Dallas College, the downtown branch of Southern Methodist University, Dallas, Texas, this unit has proved very popular and profitable. It is equipped with an automatic coin changer, and dispenses a properly chilled drink to the thirsty patron. Bottle racks and containers, to take care of empty bottles, are arranged near the vendor, encouraging the customer to deposit his empty bottle in the proper place. Neatness begets neatness.



leading soft drink companies and the practice has enabled the soft drink industry as a whole to greatly improve the quality of its beverages.

The bottle vendor delivers the drink properly chilled and ready for consumption. Some consideration, however, must be given to proper handling of empty bottles in order to avoid untidy conditions. Some patrons are inclined to carry the bottle into the theatre, which of course could not be allowed. Empty bottles on the floor of the darkened theatre auditorium would be hazardous as well as the possibility of someone accidentally dropping one from theatre balconies on patrons below. The only guarantee against these possibilities would be for ushers or attendants to prevent bottles being carried into the theatre auditorium.

Soft drink manufacturers provide bottle racks and containers designed to take care of empty bottles. These should be neatly arranged near the vendor, thereby encouraging the customer to deposit his empty bottle in the proper place. Racks should be placed well back out of traffic lanes and ushers or other attendants should be held responsible for these items, checking to see that bottle racks do not overflow or become disarranged.

THE SOFT-DRINK BAR

In larger theatres the soft drink bar will serve the purpose well. Many theatres in metropolitan cities have been using bottle bars for some time and are finding them highly successful and profitable. The soft drink bar is perhaps the best means of dispensing drinks to the patron. It can be placed in the candy counter, adjacent to or entirely separate, depending on the arrangement of the lobby. The soft drink bar does not necessarily represent a large investment and will produce handsome profits for the business if handled properly. Percentage of profits from the sale of soft drinks runs higher than many of the items sold and represents plus business to the theatre management.

Cooling of drinks at the soft drink bar can be done through the use of electric or ice units, however, electric coolers have been much more practical for theatre outlets. The important factor, as in the sale of soft drinks in any other location, is that the drinks be properly chilled to at least 33 degrees. The experience of the entire soft drink industry has been that customers will go out of their way to purchase a soft drink that is good and cold. Reserve stocks that are kept cool, or, where possible, pre-chilled, speed up the service and cut down on refrigeration expenses.

There have been a number of theatres throughout the country where soft drink bars have been installed and are proving highly popular among theatre patrons.

CUP VENDORS

The newest means of dispensing soft drinks and one that appears to hold great promise for the industry is the use of automatic cup vendors. These, in the majority of instances, are installed and operated by canteen service companies. Cup vendors are efficient and have the advantage of taking up less space because they do not require room for bottle storage. In most instances these units are installed on a contract basis by the canteen operator, which requires no investment on the part of the theatre. For the location space the theatre receives a percentage of the gross take from the vendor and all servicing is done by canteen operators.

Recent new developments in this field have brought many improvements in cup vending machines. The unit performs the complete job of carbonation, refrigeration, mixing of syrup and water, and finally, dispensing the finished drink in a paper cup ready for the consumer. All that is required of the purchaser is for him to insert a nickel in the slot. The vendor does the rest.

An important factor in operating the cup vendor is adequate service. These units must be checked and cleaned at regular intervals. Once a week the lines of the machine should be thoroughly cleaned by pumping chlorine water compound through them at a capacity rate of 25 to 30 gallons a minute. Each syrup tank should be washed and rinsed carefully before a new refill is made to guard against contamination.

IN THE LOBBY of the Fox Theatre, Joplin, Missouri, is this Dr. Pepper bottle dispenser, installed for the convenience and pleasure of the patrons of this unit of the Fox Midwest Amusement Corporation's circuit. The sale of soft drinks through this unit has boosted appreciably the volume of profits from the theatre's concessions. The primary advantage of the bottle vendor or of the bottle bar is the guarantee of serving a uniform, quality product, made strictly according to the standards established by the manufacturer, and served at the proper temperature for most tastes.



Automatic Cup-Vending Machines for Drinks

Theatre Owners Add Another Patron Service And Build Up a Profitable Revenue Source

RUTH R. MAIER
Pepsi-Cola Company

One effective way in which theatre operators can increase their services to their patrons—while at the same time benefitting from an important revenue producer—is through the installation of one or more soft drink vending machines.

Today, in view of their high operating costs, theatre men everywhere are anxious to develop subsidiary sources of income. In fact, for a substantial number of theatres, it has been estimated revenues from the sale of these various items—soft drinks, candy and other products—can spell the difference between profit and loss. By taking advantage of the modern dispensing equipment now becoming available, theatre operators can substantially increase their total revenues while also providing their patrons with a convenient means of refreshment.

CUP VENDING

An extensive study of the possibility of theatres as retail sales mediums has been made by the Pepsi-Cola Company. Besides its personal interest in the subject, the company has explored the problem from the theatre owner's point of view—taking into consideration such factors as the efficiency and convenience of operation of any equipment, the degree and frequency of servicing required, and related questions of maintenance. After careful investigation, it is believed that an automatic cup-vending machine is the ideal equipment for theatres.

It is sometimes suggested that a bottle dispenser might be adaptable to theatres. This, however, is impractical because of the breakage and theft of bottles and also the necessity of storage space for bottles and cases. Bottle dispensers serve a definite need and have their place. But in the case of theatres, their use is unjustified for two important reasons. First, a cup dispenser has a far greater capacity than a bottle machine. Second, because the appearance of a theatre lobby is of prime importance, the disposal of empty bottles would present a problem, particularly since convenient and adequate storage facilities for the empty bottles, adjacent to the machine, usually cannot be provided.

CUP-VENDING MACHINES of this type have a capacity of six hundred 9-ounce drinks of Pepsi-Cola. These machines, subjected to exhaustive tests by the company's research and engineering departments, are completely self-contained units. They filter, refrigerate, carbonate, freshly mix, and deliver in sanitary containers a good, big drink—all automatically. Only two connections are required.



The Machines

At present, two makes of cup machines have been approved by the company for dispensing Pepsi-Cola, and are recommended for theatres. The first of these is the machine which has a capacity of 600 9-ounce drinks. The second has a capacity of 1,200 drinks.

Both of these machines, which have been subjected to exhaustive tests by the company's research and engineering departments, are completely self-contained units. They filter, refrigerate, carbonate, freshly mix, and deliver in sanitary containers a good big drink—all automatically. The machines deliver an accurately measured drink, and are economical to operate. Only two connections are required—one for city water and the other for electricity.

At present, theatre owners can have the 600-drink machine installed in their houses, while the 1,200-drink vender will be shortly made available. These machines will be installed, free of all charges, by the local bottler or a vending-machine operator holding a franchise.

These attractive cup-vending machines add to a theatre's appearance. Smartly styled and beautifully finished, they have an eye appeal that immediately attracts customers—and keeps them coming back for more. Customers enjoy watching each machine pour and deliver their drinks. And—important to theatre operators—99 out of 100 people will throw their empty cups into an adjacent receptacle, when they have finished their drink.

The machines, which automatically record the number of drinks dispensed, are installed with five- or ten-cent coin mechanisms, at the option of the theatre operator. A coin changer—which accepts nickels, dimes and quarters and delivers the correct change—is available in the 1,200 cup dispenser. And any time that it might be empty, each machine will immediately return a deposited coin.

Location

The best place in a theatre for locating a cup dispenser is, of course, something for the theatre operator to decide. He will doubtless want it placed at a point adjacent to the main flow of audience traffic.

The most desired location is somewhere in the rear of a theatre—in the lobby or foyer, in lounges, or at points adjacent to the water fountain. Numerous theatre owners find it advantageous to have several cup dispensers installed—one, say, serving the balcony and the other the orchestra floor.

The bottler or vending-machine operator can be of assistance to theatre owners in locating their dispensers. At the same time, they can also advise on the capacity and number of dispensers best suited to each individual theatre's requirements.

Commission and Service

Commissions to theatre operators are determined by agreement between them and the bottler or vending operator. These commissions are a percentage of gross sales determined by the volume of business — making these vending machines a highly profitable income producer.

Experience has demonstrated that highly trained and skilled personnel are required to insure complete and satisfactory servicing of these machines. Thus, the Pepsi-Cola representative not only services these machines at frequent and regular intervals but also insures that they are at all times in good operating condition. Meanwhile, the theatre operator receives the full percentage of the gross receipts agreed upon, with no concern for any extraordinary maintenance or repair expenses.

BAR SERVICE

The purpose of this article has been to outline the methods whereby theatre operators can sell Pepsi-Cola to best advantage. Exploring the realm of possibilities, a third method suggests itself. This is to install a "Pepsi Bar," which can be used to good advantage in certain theatres.

For example, when the famous "Pops" Concerts were held at Carnegie Hall, New York, this past summer, the management of the theatre had a number of Pepsi Bars, which are easily assembled, set up in different parts of the theatre for the convenience of the audience. The smokers' lounge of the theatre blossomed forth as "Cafe Carnegie," with a brightly decorated Pepsi Bar as its focal point. In addition, smaller Pepsi Bars were located on each floor, and table service was available in the loges. Pepsi-Cola was the only soft drink served at the concerts.

While a Pepsi Bar is not ordinarily adaptable to the average theatre, the above incident is recounted for the benefit of those theatre operators who may have unusual locations, who may be holding special events from time to time, or who may want to offer their patrons the utmost in personal service. With an attendant-operated bar, of course, there is no problem of disposing of empty bottles. Any Pepsi-Cola bottler will be glad to give his advice and assistance to a theatre operator at any time he might contemplate the installation of a Pepsi Bar.

SUMMARY

The consuming public, surveys have shown, is eager to purchase soft drinks wherever they are to be found. Convenience is an important factor. For this reason, cup-vending machines are particularly adaptable to many kinds of retail outlets. Already, they are to be found in department stores and supermarkets, banks and railroad depots, schools, hospitals, airports, and a growing number of theatres.

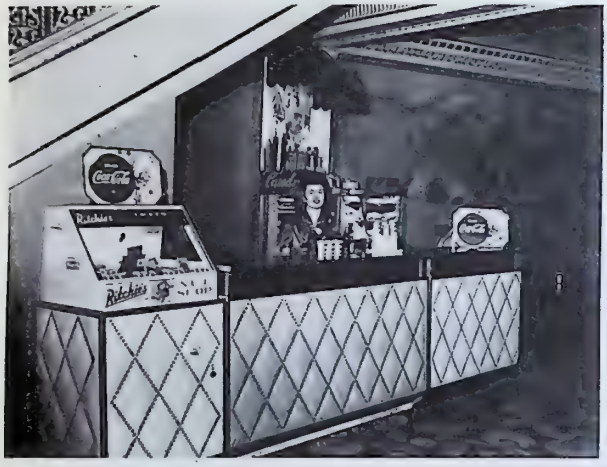
Theatre owners generally can capitalize on this significant trend by installing cup-vending machines serving Pepsi-Cola. In so doing, they will be heightening their service to patrons and developing a sustaining profitable source of revenue for themselves.

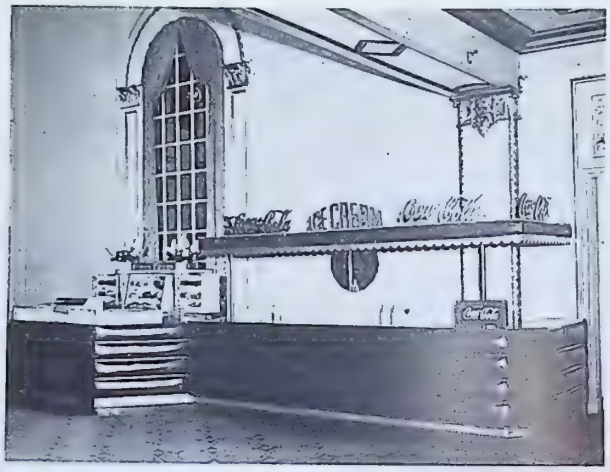
CUP-VENDING MACHINES of this type have a capacity of 1,200 drinks of Pepsi-Cola. The machines are installed, free of all charges, by the local bottler or vending-machine operator holding a franchise. The machines add to a theatre's appearance. Smartly styled and beautifully finished, they have an appeal which immediately attracts customers—and keeps them coming back for more and more.



An Extra-Profits Booster for Extra Profits

Brief Picture Review of Refreshment Stands With Beverages That Supplement Other Items





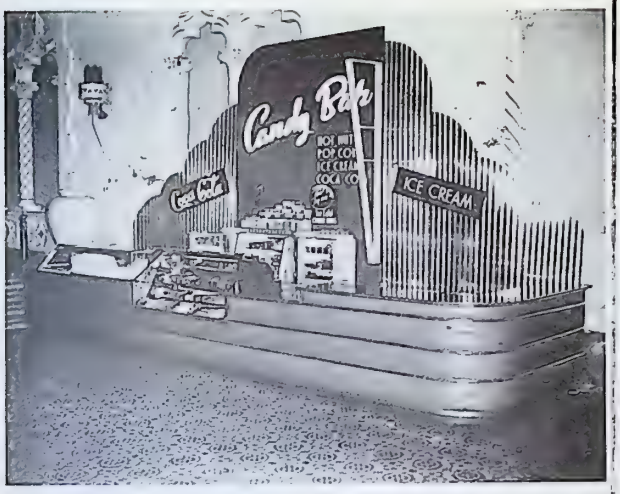


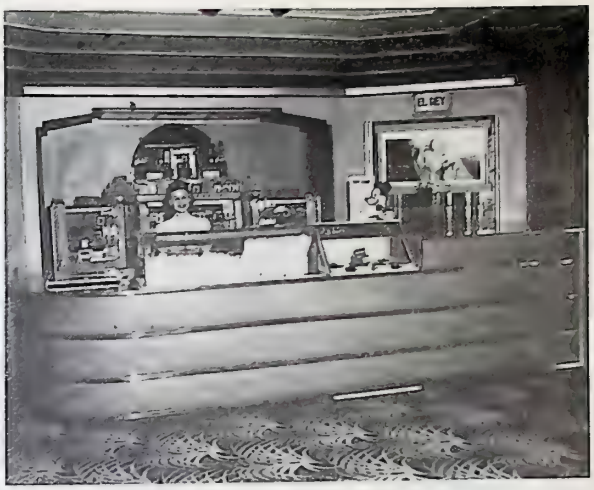
A PROMOTIONAL TIE-IN with the Atlanta premiere (1939) of "Gone with the Wind" probably brought bottled Coca-Cola to the theatre. This activity started gradually with temporary stands and refrigeration equipment and has matured until, at the present, dispensing is made over elaborate bars and other facilities, some of which are shown in these pictures. Three methods of selling—by bottle, cup-vending machines, and fountain service—have their own merits—and demerits—which vary on the physical structure of a theatre or the availability of equipment and service. The public recognizes that, in bottled beverages, it has "packaged quality," whereas the quality of the beverage dispensed through vending machines or at soda fountains is dependent upon the service rendered by the theatre or the concessionaire. No matter how perfect the equipment, the responsibility for serving a drink—which includes the right amount of syrup, the proper carbonation, and the proper temperature—rests upon the fountain attendant or the operator of the vending machines. Profits from sales in theatres are sufficiently large to merit the serious consideration of the owner of one or more theatres. By all of the three merchandising methods, sales have reached as high as one sale to three paid admissions. Admittedly this ideal per-capita consumption cannot be expected to obtain in every theatre. Beverages supplement other items.







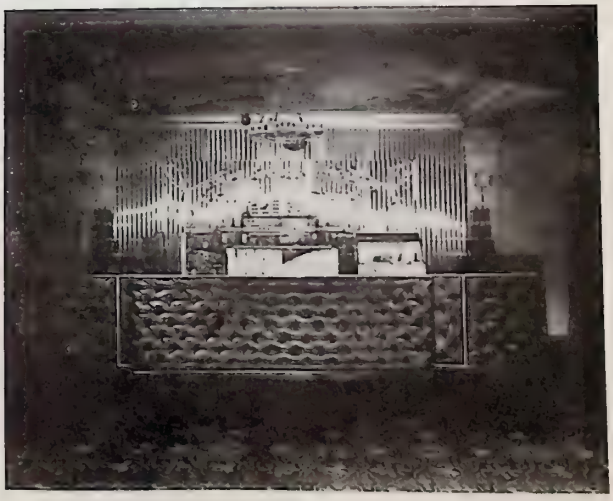

Candy Bar
ICE CREAM


EL REY


ICE CREAM
BARS 10¢
Ritchie's


Coca-Cola


Coca-Cola
10



Cretors MEANS *Craftsmanship!*





THEN

Even back in Grandma's day the "Cretors" bright red, green and gold popcorn wagon was an eye-attracting "customer-getter."

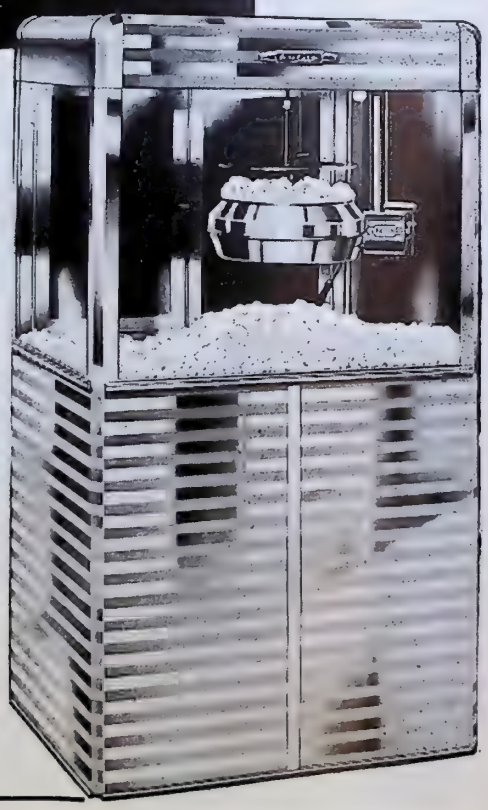
It's still a little gem of a wagon. Justice cannot be done to it in the black-and-white cut on this page, which fails to show the rich coloring, the bright reds and greens, the gleaming gold trimmings that caught Grandma's eye and made Grandpa shell out his nickels 'way back when the phrases "eye-appeal" and "impulse buying" had not been invented.

Certain it is, however, that it was one of the earliest productions of C. Cretors and Company, who gave it a name, simple and descriptive, "The Cretors" and presented that name to the world for all to see in stalwart gold letters on the wagon's side. Old, yet bearing its years valiantly, the old steam wagon still is proud of its name.

and

NOW





Cretors CHICAGO, ILL

since 1885

Today, with more than 60 years' experience in the manufacture of corn-popping machines for world-wide use, you are assured of the *best* more than ever before!

The new Hollywood model is America's *smartest* corn-popping machine! Available in a satin-finish, striped stainless steel, it is designed to harmonize with any location. Removable popping elements make for easier cleaning, assuring increased customer appeal.

Eye-arresting beauty combined with improved, concealed mechanism, thermostatic control, filtered exhaust system and modern engineering insure economical, speedy operation and large profits.

Distributors in Principal Cities

C. CRETORS & CO.

614 WEST CERMAK ROAD, CHICAGO 16, ILL.



Win Hi Pop-ularity

STOCK and SELL

Manley's HiPop MOVIE SHOW Popcorn

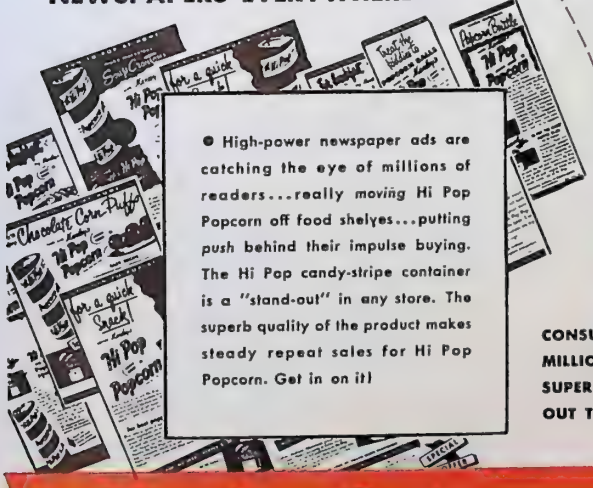


...FOR THE BIGGEST PROFITS
...FOR THE FASTEST TURNOVER

GOING! GOING! GOING! Hi Pop Popcorn sales are going like a house afire all over the country! From little hamlets to big cities, people young and old are buying Hi Pop...spurred on by the biggest *national* advertising campaign in popcorn history. Sales records are shattering. Profits are booming. Hurry! Stock up with Hi Pop, the biggest name in popcorn.

Creating Demand...

★ **ON THE FOOD PAGES OF LOCAL NEWSPAPERS EVERYWHERE**



● High-power newspaper ads are catching the eye of millions of readers...really moving Hi Pop Popcorn off food shelves...putting push behind their impulse buying. The Hi Pop candy-stripe container is a "stand-out" in any store. The superb quality of the product makes steady repeat sales for Hi Pop Popcorn. Get in on it!

CONSUMER-APPROVED BY MILLIONS IN THEATRES AND SUPER-MARTS THROUGHOUT THE COUNTRY

Advertised...

★ **OVER THE AIR AND AT POINT OF SALE, TOO**

As brokers are selected, an original and unique program will be released for multiple weekly broadcasting in their territories. Catchy jingles will win new friends quickly for Manley's luscious Hi Pop. Compelling point-of-sale posters will push sales in stores.

BROKERS

Many leading brokers know that Manley's Hi Pop is the fastest selling popcorn in the nation today. Certain territories are still available for qualified broker representation. Write us. Perhaps you, too, can join the happy family now representing us.

WHOLESALERS

in every town and city throughout the country are cashing in on the overwhelming demand for the nation's favorite popcorn...Manley's Hi Pop. If you do not have Manley's Hi Pop in stock, please contact us for the name of your nearest broker.

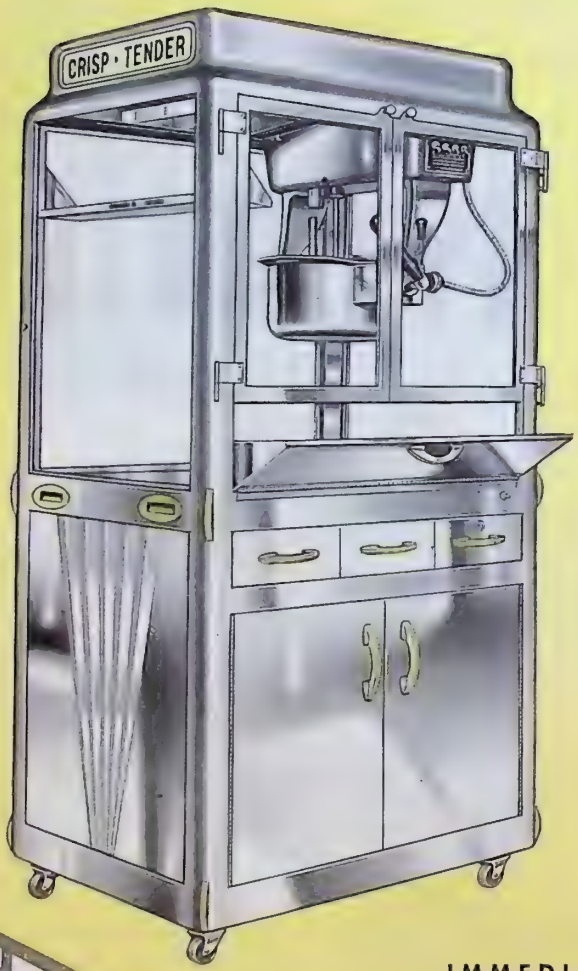
Manley, Inc.
BURCH MFG. CO.

GENERAL OFFICES:
1920 Wyandotte Street
Kansas City 8, Missouri

MANLEY'S

THE BIGGEST NAME IN POPCORN

STAR POPCORN MACHINES are world famous



BECAUSE

★ **unsurpassed performance**

STAR POPCORN MACHINES give TROUBLE FREE performance in producing large quantities of *high quality popcorn*. Over 7,500 post-war machines are now in operation.

★ **beautiful appearance**

Attractive streamline design of STAR POPCORN MACHINES add eye-catching interest that produces SALES.

★ **durable construction**

STAR POPCORN MACHINES are ruggedly constructed of lasting monel metal and solid stainless steel. No exposed screws or bolts. No complicated gadgets to get out of order.

★ **simplicity of operation**

STAR POPCORN MACHINES can be operated by anyone with a minimum of training.

★ **price**

You can pay more but you can't buy a better popcorn machine than STAR. Lowest price, high quality machine in the field. Prices start at **$398.00.**

★ **versatility**

In STAR'S complete line there are machines to fit every requirement. From counter and floor machines to wholesale popping units there is a STAR for every need. Six models to choose from.

★ **underwriter's approved**

Every STAR Cabinet Model has been approved and listed by the Underwriters Laboratories.

EXPORTERS ATTENTION

STAR POPCORN MACHINES are proving their superiority in 29 countries. Write or cable STARCO for complete export information.

IMMEDIATE DELIVERY ON ALL MODELS

STAR

FOR PROFITS . . . HITCH YOUR FUTURE TO A STAR

STAR MANUFACTURING COMPANY • 6340 St. Louis Ave. • St. Louis



Here's how the Lyric Theatre in New York City makes extra profits selling Coca-Cola

THEATRES ARE INCREASING PROFITS BY ADDING SALES OF COCA-COLA

THERE'S a source of entirely new profit for you right in your present lobby. All you need is a stand or counter and a cooler for Coca-Cola. Also there are automatic vending units that do the whole selling job for you.

There is a wide range of equipment available for any size theatre. Profits and sales usually parallel theatre attendance. And selling Coca-Cola pays a big gross profit. You can see what profit possibilities there are for you. Your patrons know Coca-Cola. They trust its quality and they like to enjoy *the pause that refreshes* with ice-cold Coke before and after the show.

We want a chance to put the full profit story on Coca-Cola before you. Write National Sales Department, The Coca-Cola Company, 515 Madison Ave., New York 22, New York, or get in touch with your local Coca-Cola bottler.

Ask for it either way . . . both trade-marks mean the same thing.

"FEATURE ATTRACTION"

FOR *Additional* PROFITS!



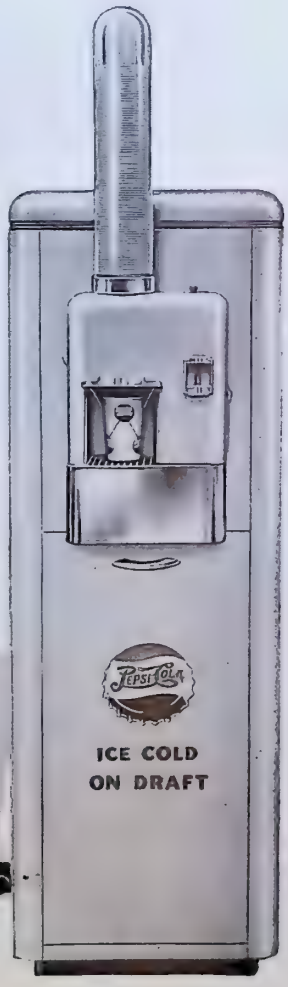
1200 CUP CAPACITY



PROFITS! You can't miss *making* additional profits when you install a Cup Vendor for Pepsi-Cola. Pepsi *sells*—it's *the* bigger-better, nationally-famous, nationally-popular drink, backed by national and local advertising. And the way these handsome automatic vendors serve Pepsi . . . freshly prepared, perfectly blended, ice-cold . . . means repeat sales, top turnover. It'll pay you to talk with our representative about the extra profits these Cup Vendors will bring you.

CONVENIENCE! No bottles to handle or return; no breakage. Separate cup disposal unit does away with untidy litter around machine. You needn't even supply change for your customers; self-operating coin-changer, which makes change automatically, is optional equipment, and may be installed *within* the vendor itself, for your convenience.

BEAUTY! These Cup Vendors are an attractive, eye-catching addition to your lobby or lounge. Models approved by Pepsi-Cola Company are beautifully designed and proportioned, modern as this minute in appearance; come in a soft, pleasing grey that blends with any background, fits into any decorating scheme.



85 CUP CAPACITY



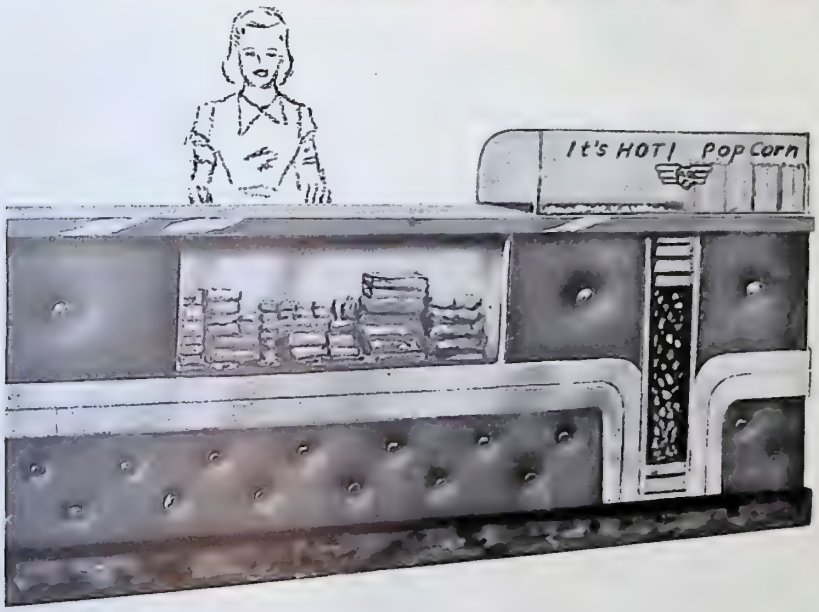
For complete information, write, wire or phone:

Pepsi-Cola Company, Cooler and Vending Department, Box T, Long Island City, N.Y.

BERLO'S COMPLETE SERVICE

MEANS MORE NET PROFIT

FOR THEATRE OWNERS!



Check these facts and see why:

Candy Stands
Candy Vending Machines
Popcorn Stands
Popcorn Vending Machines
Beverage Dispensers
Beverage Vending Machines
Complete Lobby Shops

- BERLO buys, installs, maintains the equipment.
- BERLO buys and carries all stock.
- BERLO pays for sales promotion.
- BERLO carries both public liability and product liability insurance.
- BERLO pays all salaries.
- BERLO pays social security, workman's compensation and unemployment taxes.

YET OPERATING EFFICIENCIES ENABLE BERLO TO SEND YOU A BIG LOBBY PROFITS CHECK EACH MONTH!

BERLO VENDING COMPANY

A DIVISION OF ABC VENDING CORP.

333 S. Broad Street, Philadelphia 6, Pa. Offices and Warehouses in Principal Cities

EXTRA PROFITS for DRIVE-INS

HAVE YOU HEARD OF—The Light That Sells?

• • • with the FIRST functionally planned, high quality • • •

AUTOCRAT

In-A-Car Speaker Unit

FEATURING:

"THE LIGHT THAT SELLS"

Sensation of the recent TESMA CONVENTION!

FEATURE NO. 1:

The new CONCESSION SIGNAL provides the patron with the ability to call for a Refreshment Vendor or Car Hop without leaving his car, and by merely throwing a toggle switch on the face of his in-a-car speaker.

FEATURE NO. 2:

With the new CONCESSION SIGNAL the desire to eat or drink does not distract the patron's eyes from the screen enjoyment, in order to find the nearest vending cart. "The Light that Sells" attracts the Vendor instead.

FEATURE NO. 3:

The new CONCESSION SIGNAL levels off the "show break" rush at the concession stand . . . and builds a more steady "full show" patronage with a resultant higher nightly gross.



FEATURE NO. 4:

With the new CONCESSION SIGNAL there is no more need to stumble over ramps and through the dark to the concession stand . . . or, more important, to put off the purchase because of such a journey.

FEATURE NO. 5:

The new CONCESSION SIGNAL allows you to service your patron's impulse sales courteously, quickly and efficiently; without annoying or distracting them when they are not in the market.

Plus—

FEATURE NO. 6:

"The Light that Sells" becomes a light that also saves you money . . . for should the in-a-car speaker be pulled from the junction box either by accident or design, the light comes on immediately and draws the attention of the nearest staff member.

THE AUTOCRAT is the *ONLY* speaker unit sold with this absolute *GUARANTEE!*

We are so confident of the durability and quality of our speakers, that a five year GUARANTEE is given for the complete repair and replacement of any speaker for $5.00 regardless of whether speaker or case has been broken, run over or damaged in any respect. Any broken or damaged Junction box will be repaired for $3.00.

This GUARANTEE covers all phases of mechanical and electrical construction as to parts, labor, etc.
All speakers are SEALED at the time of manufacture to prohibit tampering. They should not be taken apart. Speaker must be intact when sent for repair, or satisfactory reason given to make this guarantee binding.

INVESTIGATE NOW! DON'T DELAY! YOUR EARLY ORDER WILL ASSURE DELIVERY FOR NEXT SEASON'S OPENING!

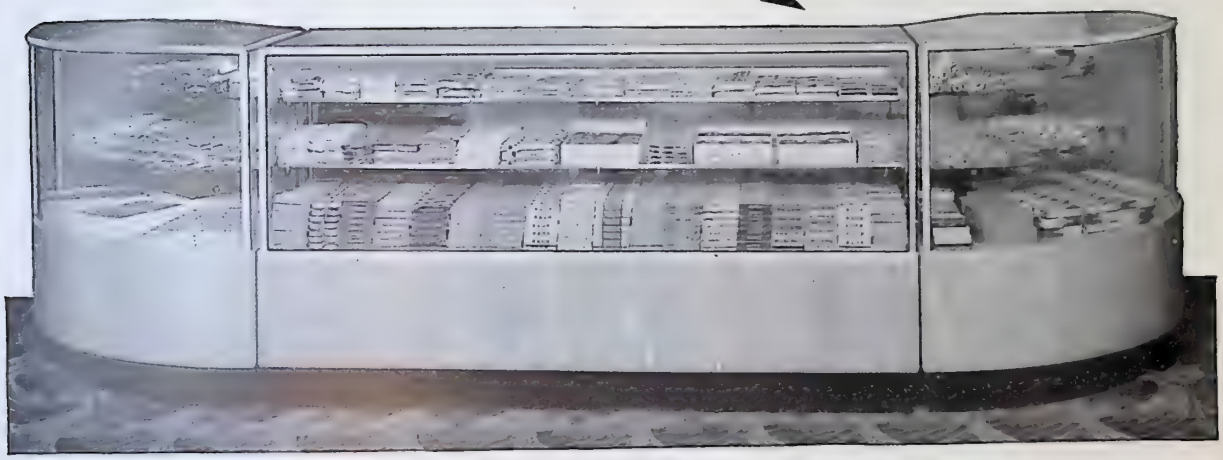
AUTOCRAT, INC. — *Creative Theatre Engineering* —

DAYTON VIEW STATION (P.O. Box 37)
DAYTON 6, OHIO

Extra THEATRE PROFITS

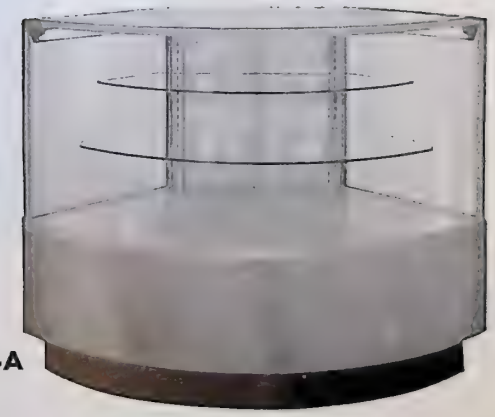
with a *Columbus* EQUIPPED DEPARTMENT

like this





M-700



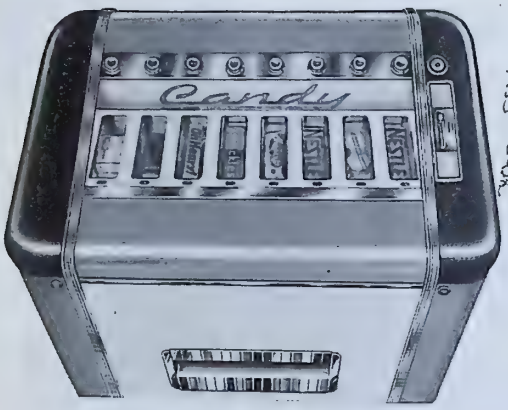
M-700-A

Turn a portion of your lobby or foyer — locations that are not paying their way — into profit-making areas with the installation of a Columbus equipped confections department. Many theatre owners report sales to as many as one-third of their patrons.

The sturdy construction of Columbus Cases of select cabinet wood and their scientific design make them a proud addition to any theatre. Two useful cases are illustrated. There are many others. Write for details.

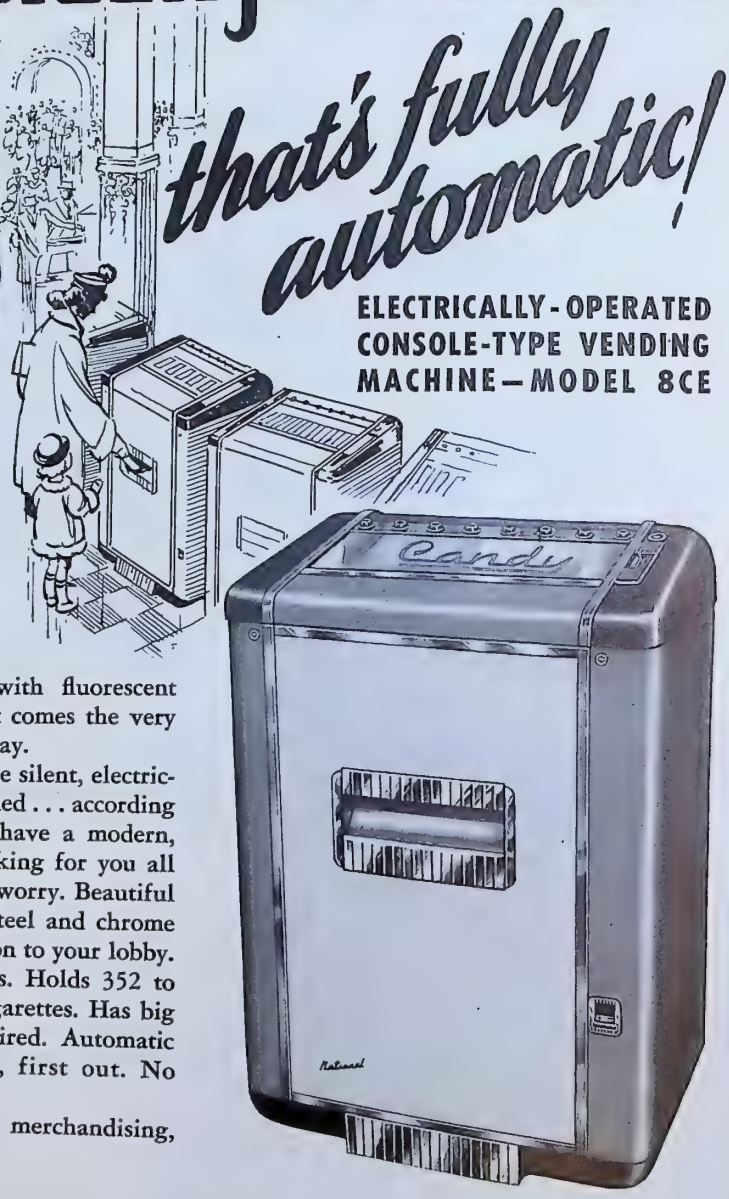
THE *Columbus*
SHOW CASE CO.
850 W. Fifth Ave.
Columbus, Ohio

Now, a New NATIONAL MERCHANDISER for Theaters



that's fully automatic!

ELECTRICALLY-OPERATED CONSOLE-TYPE VENDING MACHINE—MODEL 8CE



FOR INCREASED SALES, install this revolutionary new NATIONAL automatic merchandiser.

Customers wait on themselves. Their favorite candy bars or other merchandise are right before their eyes . . . in a handsome plexiglass display panel with fluorescent lighting. They drop in a coin and out comes the very merchandise they chose from the display.

Have one, two, three or more of these silent, electrically-operated NATIONAL units installed . . . according to your business volume . . . and you have a modern, completely automatic sales-maker working for you all the time—without watching, without worry. Beautiful two-tone finish and trim of stainless steel and chrome makes NATIONAL a handsome addition to your lobby.

Operates on nickels, dimes, quarters. Holds 352 to 400 candy bars, or 800 packages of cigarettes. Has big capacity for other merchandise if desired. Automatic rotation of merchandise . . . first in, first out. No rehandling, no resetting of trays.

For truly revolutionary automatic merchandising, install NATIONAL.

• National Vendors, Inc. •

5055 NATURAL BRIDGE • ST. LOUIS 15, MISSOURI

ED BROWN
2808 McKinney Avenue
Dallas 4, Texas

L. H. CANTOR
11219 Superior Ave.
Cleveland 6, Ohio

E. C. McNEIL
713 So. Westmoreland
Los Angeles, Cal.

A. A. WEIDMAN
5911 Fourth Avenue
Detroit 2, Mich.

BOOK FOUR: FUTURE DEVELOPMENTS

TELEVISION

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TELEVISION

1947-48

A Producer Looks at Television in Theatres

The Popularity of the Neighborhood Cinema Will Be Augmented by Using Video Adjuncts

JERRY FAIRBANKS
Executive Producer, Jerry Fairbanks, Inc.

Television is rapidly climbing out of its cradle and a tremendous upheaval in entertainment history is about to get under way. The change, however, will not be harmful to box-office returns or to the popularity of motion pictures, as many theatre owners believe.

The operator who fears television and who envisions empty theatres is laboring under a misconception. So also is the man who sees a chain of houses all receiving by television his pictures from a central telecasting point miles away.

The word television has become a bugaboo to theatre owners without any real justification. Video is something to anticipate with pleasure, not fear. Instead of hurting theatre business, television should expand it.

The day will probably come when the regular feature is halted and a special telecast of some major news event is shown to the audience. Interest, obviously, is more centered on another Texas City disaster or the winning run of the World Series than on a screen clinch. Personally, I am also looking forward to the time when I can sit in my neighborhood theatre and see a television newsreel of the day's events. This, I believe, will be available to theatre audiences by having special films photographed directly from a video receiver, probably located in the projection booth.

A new process has been developed in which film may emerge from the developing equipment in a condition suitable for projection in less than one minute after the material is photographed. The processed film can be edited according to the interests of the particular audience and then run through the conventional projector that is fitted with some minor electrical and mechanical modifications. In fact, theatres in the future will have newsreels more timely than the newspaper being sold in front of the building.

In brief, television will enhance theatre programs, provide a greater drawing card, a greater incentive to go to the show. Good showmen should have a permanent field day.

Home reception of television definitely will not supplant the theatre any more than radio has supplanted the opera house or the concert stage. Just the opposite; it can be as great a boon to the theatre as sound was to the silent picture.

It takes Hollywood months, requires the services of thousands of people, and takes millions of dollars to ready a hit picture. There is no sponsor who can afford to spend that much money, employ that many people, and rehearse a show for that length of time. The theatre, accordingly, will remain the focal point for entertainment.

Another important consideration is this: People like crowds, but definitely! Have you ever seen a comedy in a projection room by yourself? It is not nearly as amusing as when it is seen in a filled theatre.

Television also will expand show business through the mushrooming of a new type of theatre, one very similar to the newsreel house. Here "live" telecasts will be featured. For the price of a ticket, the theatregoer will see the news events of the day as they happen or in review, the Rose Bowl game, or the inauguration ceremonies as the President of the United States is sworn into office.

Personally, I do not see in the near future—although there are many who do—a chain of theatres all receiving by television motion pictures telecast from a central point miles away.

As every house manager knows, different localities have a preference for different pictures. What draws at one house may not draw at another. One section of the same city may like Wallace Beery, another may stay away from the same feature. Full-scale theatre video would necessitate all houses playing the same bill the same number of days of the week. It would be impossible to pull a failing picture and substitute another.

A televised program would require every house of a circuit to start and end its show at the same hour. Juggling of programs and starting times would be impossible. An early house would have to open at the same hour as a late one. Intermissions would have to be standardized and no allowance could be made even though one house had a capacity crowd and another had only a few seats filled.

The actual cost of producing pictures will not be altered by television. The saving on prints by circuit telecasting is small and the inconvenience is great.

Theatre television, as I see it, however, is still a number of years in the future. For one thing, a cross-country network system must be developed, completely perfected, and constructed. Only when the bugs have been eliminated from home video transmission and reception will theatre television develop to full practical maturity. Paying audiences demand top quality.

When theatre video is perfected and in popular use, however, I am inclined to believe that theatre operators will find the television-film method the best for their purposes. Pictures made visible on a cathode-ray tube can be photographed and developed with only a few minutes delay. This film then can be quickly edited and projected on the screen at the appropriate moment. This saves using bulky equipment in the aisles (as is used now) and probably will be less expensive. It also means that an event of importance can be shown to the second-show audience as well as to the first.

Television in theatres is a foregone conclusion, but hold no fear of it. The popularity of the neighborhood theatre will be greater than ever—thanks to video.

CINE-VIDEO COOPERATION is illustrated here, with Jerry Fairbanks (center), Hollywood producer, pointing out to O. B. Hansen (left), NBC chief engineer, the details of the Zoomar lens, developed by Dr. Frank G. Back (right) for use with television cameras. The Fairbanks Zoomar, designed for television use, has been, through a more compact version, adapted for use in 35-mm. newsreel cameras.



The Present Status of Theatre Television

A Review of Large-Screen Video Projection And Discussion of Possible Things to Come

Theatre television — that lusty, husky child of scientific research and engineering development—was born at 8.00 p.m. on September 12 before a discreet audience in the main dining room of Atlantic City's famed Ambassador Hotel.

And, as the likeness of W. W. Watts, vice-president in charge of the Radio Corporation of America's engineering products department, was reflected from 48 square feet of television screen, there was no question as to the accuracy of his statement that this was, indeed, "a unique demonstration which marks an historic step in television" by being "the first time that live-action television pictures of this size have been presented with high resolution and brilliance made possible by new advances in optics, cathode-ray tubes, and electronic circuits."

To be sure, no exhibitor can tomorrow purchase the equipment that was demonstrated—nor its dozen or so equally experimentally designed brothers — but no further proof is needed that the basic principles of large-screen television have been determined and actual working models developed.

PERIOD OF TRAVAIL

Scientists, engineers, and great corporations are ofttimes annoyingly reluctant to put into so many words that which many a less technical mind deduces as a logical conclusion to the known facts.

That television should eventually come to the theatre has, almost since the inception of television itself, been a foregone conclusion, and all the advances that have been made in the pick-up, broadcasting, and home reception of television have only added to that fund of knowledge which should eventually be applied to the problem as it has a bearing on theatre uses.

Even for home receivers the television industry has been hard-pressed to satisfy a natural demand for larger and more brilliant pictures. The latter has to a large extent been achieved through the developments of micro-thin metallic films and phosphors for the screen surface, as well as through developments in the electronic aspects of the tube itself. The problem of larger images was solved in part by larger tubes, and, in part, by the development of a projection system, the present large-screen demonstration being the culmination (up to the present, at least) of such researches.

Still the manufacturers were reluctant publicly to use adjectivally the word "theatre" in connection with large-screen projection television apparatus. But the implications were obvious, and when the Radio Corporation of America announced the consummation of research and development pacts with Warner Brothers Pictures, Inc., and 20th Century-Fox Film Corporation, all that remained was for the company publicly to declare what the industry now knew perfectly well was happening.

Accordingly, the theatre industry welcomed the statement of Frank M. Folsom, executive vice-president in charge of the RCA Victor Division, that "Developments in television have reached a point where they can be of definite service to the motion-picture industry. Practical tests and experiments will determine how television can be used for the best interest of the industry and the theatre-going public."

The same militancy was indicated in Atlantic City when Frank E. Mullen, now in charge of the television activities of the National Broadcasting Company, Inc. (an RCA subsidiary), declared "RCA is through waiting," and, so far as television is concerned, "we are down to practicalities."

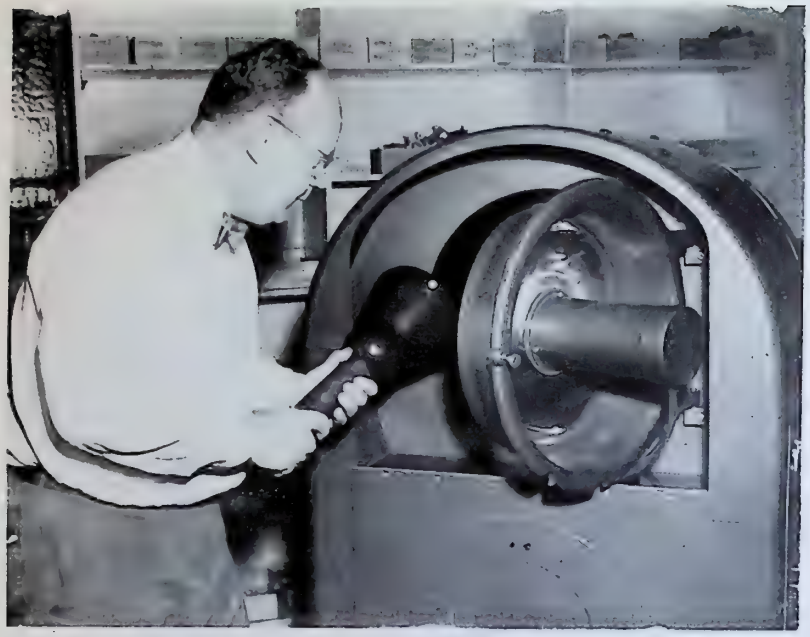
EQUIPMENT DETAILS

Concentrated study and experimentation by scientists and engineers have revealed that the most efficient and effective system for projecting large-screen television images from the face of a cathode-ray tube is one employing the principle of reflective optics. The great light-gathering power of the spherical mirror makes it possible to project a very high percentage of the light appearing on the face of the cathode-ray projection tube.

With the new reflective optical sys-

THE LARGE SCREEN TELEVISION PROJECTOR is shown here with an operator at the control console. The unit, employing an RCA-developed system of reflective optics, produces pictures on a screen 8 feet wide by six feet high. Programs fed to the unit from any standard television source can be enlarged by the projector for audiences. In theatre use, a remote control system would be possible.





THE NECK OF THE TELEVISION TUBE is inserted in the can-like tube at the front of the projector as is being done here. While the projector is designed for fixed focus operation, the various controls mounted on the unit permit the operator to adjust the brightness, focus, and framing of the picture. Once the equipment is set for the start of a program, only slight adjustments will be needed later.

tem developed and incorporated in the advanced experimental large-screen television projector, the quality of screen illumination provided is said to be comparable with a conventional *f*/2.0 projection lens, while the amount of light reaching the screen is about six or seven times as great.

The 6-by-8 Projector

Let us, then, look to what the equipment practicalities are, as of this present moment in the light of the Atlantic City demonstrations, which was put on for late-staying delegates to the first annual convention of the National Broadcasting Company and the early-arriving delegates to the sessions of the National Association of Broadcasters. Cooperating in the demonstrations were the American Broadcasting Company, Inc., Philco Corporation, NBC, and RCA.

The optical system of the projector consists of two elements: (1) a 21-inch spherical mirror and (2) a 14-inch aspherical correcting lens—mounted in a tubular housing. A 7-inch, metal-backed, high-intensity developmental projection tube is placed in such a position that its face is directed toward the magnifying spherical mirror that is pointed at the projection screen. The large spherical reflector greatly magnifies the picture picked up from the face of the projection tube and projects it through the 14-inch aspherical lens onto the beaded screen 15 feet away.

The use of a spherical reflective lens with a large aperture introduces difficulties in focusing and results in a certain amount of distortion. For this reason the specially ground, weak, aspherical correcting lens is used to introduce an amount of distortion which is equal to and opposite that caused by the spherical mirror. The effect of the aspherical lens, then, is to balance out the distortion of the reflective lens, and the rays of light arriving at the screen produce an undistorted and greatly enlarged version of the original picture, which, in this case, is 8 feet wide by 6 feet high, or producing an enlargement of about 16 diameters.

The special projection tube, or kinescope, employed in the large-screen projector was especially developed for use in reflective optical systems. Into this projection tube was designed a metal-backed screen such as is used in all RCA projection tubes. In order to obtain light of proper brilliance for projection, extremely high acceleration voltage is required, in this case 50,000 volts.

Tube engineers developed new types of phosphor compounds which were coated with a fine metallic film, thin enough to allow the passage of electrons. This greatly increased the tube brilliance. In addition to this, a new type of electron gun and other elements were developed to withstand the very high current used by the projector. The result is a tube which produces a brilliant white light, nearly as dazzling to the eye as that from an arc lamp.

The developmental tube, the reflective optical system, and the necessary power supplies and control equipment are all self-contained in one unit. While the projector is designed for fixed-focus operation, the various operating controls which are mounted on the unit permit the operator to adjust the brightness, focus, and framing of the picture. Only a slight adjustment is necessary for an entire program.

A new type of power supply has been incorporated into the large-screen projector which eliminates the danger usually present when high voltages are used. A high-frequency oscillator power supply is used, instead of the conventional 60-cycle type, which prevents the storage of high voltage in the filter circuits, and, thus, eliminates the potential hazard to operating personnels.

Television signals can be fed to the large-screen projector from any regular television source, such as network coaxial lines, microwave television relay sources, from studio or camera pickup sources, or any other standard RMA video signal sources.

The 18-by-24 Projector

The investigations that led to the development of equipment for projecting a 6-by-8-foot picture did not stop at that point, but, rather, continued toward "bigger and better" ends—that of pictures really of theatre size. That was to have been expected—but to have the announcement by the Radio Corporation of America's Ralph V. Little, Jr., and I. G. Maloff of an experimental model television projector for an 18-by-24-foot pictures come just 41 days after the earlier demonstration was surprising in its suddenness.

The new equipment, which more than doubles the screen size developed by British engineers, operates on the same principle as that already described. Here the optical system employs a spherical mirror 42 inches in diameter, an aspherical correcting lens 36 inches in diameter, and a high-voltage kinescope with a screen surface 15 inches in diameter. The kinescope is designed to operate at 80,000 volts.

As experimentally designed and tested —a public demonstration has not been made at the time this material was prepared—the large projector has a 40-foot throw.

When this equipment is perfected for actual theatre use—and the concurrent matters of program material and when, and how, to use it are reasonably settled—the question of its location will have to be solved.

With theatres having balconies, whose rail is not more than 40 feet from the screen, the positioning of the television projection equipment seems to be easily solved—even if at the expense of a few seats. And it is not possible to think that, as still further refinements are made, the equipment may yet be installed in the projection booth itself. When this time comes, it may be necessary to provide projection rooms with an over-all width of about 32 feet, or about twice what the ideal booth for two projectors is presently considered to be.

Since the desire to utilize television is not dependent on the presence of a balcony, provisions for equipment must be found for the shelf-less theatres. At present the logical thought is directed toward suspending the projection equipment on a pulley arrangement, lowering it when needed. As a variation of this idea, and perhaps a more satisfactory solution, would be to suspend the equipment from the ceiling girders—assuming, of course, the original construction would sustain the added load—in a permanent and accurately positioned installation. The location would be such that the cinematic projection beam would just clear the lower end of the television housing.

Such installation in non-balcony situations presupposes are further development: that of remote control. Such



THE MAGNIFYING POWER of the special mirror is illustrated by the reflected image of the clasped hands of W. W. Watts (left), vice-president in charge of the Radio Corporation of America's engineering products division, and Col. Nathan Levinson, head of Warner Brothers' studio engineering and technical research staff, on the occasion of the signing of a cooperative research agreement. The 42-inch mirror developed for the 18 x 24-foot projection television system, weighs 350 pounds. This lens, as part of the television research equipment, was sent to Hollywood under terms of the pact.

remote controls are probably in the process of development, as it, generally speaking, engineeringly possible to operate by remote control any apparatus which can be manually controlled.

The Screen

Should theatre-size television projector be perfected in the near future and adopted into the entertainment scheme of the American cinema, additional problems will be encountered, mainly those concerning the screen.

Under the present circumstances, projection television employs a beaded screen, in contradistinction to the perforated sound screen of general use. Such beaded screens, of course, would necessitate the placement of loudspeakers at the side of the screen during the television portion of the program. The regulation sound screen is not desirable because the television projector is not yet able to throw sufficient illumination to overcome the approximate 15 percent light loss occasioned by the perforations. Accordingly, as television comes to theatres, it will probably be necessary to lower the special beaded screen for the video part of the program.

Since theatre television can be considered to be the logical expansion of research for home-received video-and-audio broadcasting—and the never-ending quest for ways to make pictures bigger and brighter—we may well take a look at what research is developing for screens in the large-picture home receivers.

Directional projection screens, which concentrate the available light into the desired viewing field are an important aid in obtaining adequate brightness. Although various directional screens have been proposed, the primary consideration has always been how such a screen could be made at a cost to permit its use.

A study of the factors governing the design of projection screens for home receivers was presented last fall to the Optical Society of America by R. R. Law and I. G. Maloff, of the Radio Corporation of America. They described an improved laminated-plastic screen in which a Fresnel field lens and a multiple-element vertical cylinder lens are embossed on transparent Plexiglas front and rear surfaces. To render the moire effect unobjectionable and provide vertical dispersion a thin Vinylite sheet containing a requisite amount of silica opacifier is interposed between the two transparent sheets. The two sheets of Plexiglas, with the Vinylite sheet between them, are bonded in a heated press in a single operation.

The screen provides a brightness gain of 7.5 without perceptible hot spot. In combination with large-aperture reflective optics, it gives a 15-by-20-inch picture having highlights with a brightness of more than 50 foot-lamberts, which compares favorably with highlight brightness obtained with direct-viewing kinescopes and more than satisfies the recommendations for good motion-picture-theatre practice.

With progress in screens for large-picture home television sets, it is not illogical to expect that the Law-Maloff researches may be expanded to include screens of sizes usually used in theatre—and the work might be further expanded to include the possibility of developing a screen which could be used for motion pictures and television.

In the event that such a dual-purpose screen should come into being, a further problem presents itself: the difference the angle at which television and motion-pictures would be projected. Since the television projector already has a correcting lens, it should not be too severe a problem to design an aspherical correcting lens which would not only correct the image from the spherical mirror but do it in such a manner, adding what additional compensations are needed, that the television images would be perfectly reflected from the picture screen.

The possibility of rear-projection television equipment, with suitable screens, is not to be overlooked, since it is not difficult electronically to reverse position of a television image.

TELEVISION IN STUDIOS

Where television is concerned, the industry quite naturally thinks first of the use of the new medium in connection with theatres. That the same idea obtains in the television industry is apparent in the joint research pacts signed by the Radio Corporation of America with Warner Brothers Pictures, Inc., and 20th Century-Fox Film Corporation last summer. Col. Nathan Levinson will direct the experimental program for Warners at the company's Burbank studios, while Earle I. Sponable will hold a similar 20th Century post for the work to be conducted in the studios of Movietonews, Inc., in mid-town New York.

Both pacts were announced for joint programs of research on large-screen television, and both picture companies have widespread theatre interests, units of which might easily be equipped to serve as practical laboratories. But the separation of the research locales indi-

cates further uses, and uses suitable to motion-picture production.

One possible use is apparent—and one on which plenty of work probably has yet to be done before it can become of practical service. Since motion pictures' year one, a great problem has been the great amount of light required for filming and the heat produced by that light. Even on location, too, light is sometimes a factor, especially when work has to be postponed because of deficient sunlight.

In television are two developments that, with concerted work, could be brought to bear on this problem. In the first place, there is the Image Orthicon pick-up tube that is so sensitive that it will pick up a scene illuminated by a single candle. The second, which would be developed for specific use simultaneously with the Image Orthicon, is a camera recently developed by the Eastman Kodak Company for recording television programs from the face of the monitor tube.

The 16-mm. camera was developed in cooperation with National Broadcasting Company's WNBT and the Allen B. DuMont Laboratories' WABD to enable such recorded programs to be reused by sponsors for institutional public relations and advertising, to record transmitted shows for billing purposes, and to record (for legal and other reasons) all live programs which are broadcast.

With the coincident development to new uses of these items, it might be possible to diminish the amount of light required for studio productions photographed in the usual way and to substitute Image Orthicon cameras where more mobility with absolute silence is of paramount importance. On location, companies would be entirely freed from the vicissitudes induced by a recalcitrant sun.

Since Warners is handling the West Coast section of the projects, one may reasonably expect developments along these lines. For 20th Century in New York, the potentialities for newsreels are obvious. As the work progresses, development, undreamed of at present, can be expected.

COLOR TELEVISION

While most of the large-screen television demonstrations were black-and-white, it is not an illogical assumption that the Radio Corporation of America has in mind the theatre angles in conjunction with its parallel studies on large-screen color television.

Indeed, in April, 1947, color television pictures on a 7½-by-10-foot theatre screen were shown by RCA in a demonstration of its all-electronic color television system at the Franklin Institute in Philadelphia. This demonstration, and an earlier one at the company's laboratories in Princeton, New Jersey, employed only color motion pictures and stills. The Atlantic City demonstration, while black-and-white, revealed the possibilities of large-screen presentation of live talent.

The April color demonstration, as reported by the Research Council of the Academy of Motion Picture Arts and Sciences, was considered sufficiently satisfactory for theatre demonstration, although not up to the quality of the average cinematic color.

According to Dr. V. K. Zworykin, technical consultant of the RCA Laboratories Division (and a company vice-president), several years will yet be required for the development of color television to a state of perfection equal to that of the present black-and-white television.

In the electronic simultaneous color process, three separate images in red, green, and blue are transmitted at the same instant over adjoining television channels of the same band-width used in standard television. Then, at the all-electronic receiver, which features a new type of receiver-projector, the three color signals are applied to kinescopes, or picture tubes—one with a red phosphor face, one blue, and the other green. The flickerless pictures formed on the face of each kinescope are projected by an optical system to the auditorium or theatre screen in perfect registration to form a single image blended in the same colors as the original.

THE HIGH-INTENSITY PROJECTION TUBE, shown in the center of the circular aperture, directs its brilliant image to the 30-inch mirror which is part of the optical system, and combines magnifying power with minimum light loss. In order to obtain the proper brilliance, an extremely high acceleration voltage is required, in this case, 50,000 volts. For the 18 x 24-foot picture 80,000 volts are needed.



THE FUTURE

Just as it is not given to anyone to know into just what sort of a person a baby will ultimately develop, so no one can tell today into what this infant equipment will develop in the not far distant future.

Yet it takes no seventh son of a seventh son to hazard a fair guess, just on the strength of published statements, the obvious facts and developments that must have obtained before such statements could be made with official positiveness, and such technical and off-the-record thoughts and opinions as have been expressed in formal technical discussions at conventions and the more informal and extemporaneous discussions of problems of mutual interest.

When all this may come to be is quite another matter. But one is lead to believe that it is not as far distant as some would have the world believe. It is not now a matter of technical research to determine principles and laws, and to develop working hypotheses: it is rather the engineers' problem to take what science and research have brought into being and develop a line of equipment better adapted to serve the purpose in mind, and to bring to commercial perfection equipment for maximum service.

PROFESSIONAL 16MM FILM USE

1947-48

The Carbon Arc for 16-mm. H-I Projection

Improved Light Intensity With Carbon Arcs Yields Increased Screen and Audience Size

E. R. GEIB
National Carbon Company, Inc.

High-intensity carbon arcs for 16-mm. projection were first introduced in 1938. In the intervening years, 16-mm. projection has grown so extensively and now promises such wide application, that high intensity light sources for this media are more than ever considered a necessity.

Before the war most professional 16-mm. film was educational or industrial in nature. The vast number of teaching and overseas entertainment films printed on 16-mm. for the Armed Forces during the war has popularized and stimulated the adoption of this narrow-gauge film for educational, commercial, training, sales, industrial, and small-theatre feature use. The latter development is particularly true of the European continent, Latin America, and other countries where lower cost of operation, shortage of the larger 35-mm. equipment, and lower transportation costs for the smaller film have influenced large numbers of theatres to employ 16-mm. features exclusively.

Whether a rapid increase in 16-mm. feature houses does or does not take place in this country because of the many installations and the high investment in 35-mm. equipment already made by American theatre operators, it is evident that high school and college auditoriums, factories, hotel ballrooms, churches, and small-town portable shows are destined to use 16-mm. projectors extensively. Sixty thousand 16-mm. projectors are now available to school and adult educational groups alone, according to one estimate, and it is anticipated that 300,000 halls and 274,000 churches will gradually be equipped to show 16-mm. films.

INCREASED LIGHT WITH ARCS

Regardless of whether 16-mm. showings are for theatrical or non-theatrical purposes, it is certain that larger screens and increased brightness will be demanded for economic operation and better audience enjoyment. This result can best be achieved by the use of carbon-arc trims to increase the light supply.

The most powerful incandescent lamp generally available for 16-mm. projection is the 1,000-watt, 10-hour lamp, throwing 275 lumens of light on the screen through an *f*/1.6 untreated lens and shutter of 60 per cent transmission. National Carbon Company's Pearlex carbon-arc trim delivers four times as much light, or 1,100 lumens, to the screen under the same conditions[1]; and a new 6-mm. experimental carbon trim for 16-mm. projection described recently[2] will deliver two and a half times as much light as the Pearlex trim, or 2,750 lumens, to the screen. This is equivalent to ten times as much light on the screen as is being delivered by the incandescent lamp.

The desirability of this increased volume of light with respect to greater screen size and audience size is at once apparent.

LARGER SCREENS, AUDIENCES

The SMPE Committee on Non-Theatrical Equipment has recommended[3] certain procedures and conditions to be observed in the presentation of 16-mm. motion picture film to provide a picture that can be viewed to good advantage by everyone present. Among the recommendations made are the following:

(1) Distance of farthest spectator from screen should not exceed six times the width of screen image.

(2) Distance of nearest spectator from screen should not be less than twice the width of screen image.

(3) Viewing angle of no spectator should be greater than 30 degrees.

(4) Optimum screen brightness, 10 foot-lamberts measured with shutter running but without film.

(5) Limits of screen brightness, not more than 20 foot-lamberts or less than 5 foot-lamberts, measured as above.

(6) Color-temperature of the light delivered to the screen to be in the range from 3,000 to 4,700 degrees Kelvin.

(7) The use of matte type of screen "in all cases where a projector of adequate illuminating power can be obtained."

It will be noted from the above that 10 foot-lamberts is the optimum value of screen brightness recommended. This is identical with the preferred value for viewing 35-mm. film as specified by ASA standard Z-22.39-1944.

The 1,000-watt incandescent lamp, delivering 275 lumens to the screen through a 2-inch, *f*/1.6 lens and shutter of 60 per cent transmission, will cover at an 80 per cent side to center distribution ratio only a 5.7 foot wide matte surface screen (of 75 per cent reflectivity) at this optimum 10 foot-lamberts brightness.

The Pearlex carbon arc trim provides an image 11.3 feet in width at the optimum recommended level of brightness, and fills a 16-foot screen at the minimum limit of 5 foot-lamberts brightness. The illumination provided by the new 6-mm. experimental trim is adequate to light a 17.9-foot screen to the preferred 10 foot-lamberts value.

Seating capacities based upon the use of 20-inch seats, 32 inches back to back, with a limit of 14 seats between aisles as prescribed by the laws of some states, show that presentation of 16-mm. film with Pearlex trim can be made before approximately 400 seated spectators at optimum screen brightness, and before an audience of 800 at minimum limit of brightness. With the experimental 6-mm. trim, seating capacities could be raised to approximately 1,000 at optimum 10 foot-lamberts brightness, or 2,000 at minimum limit of brightness. (See Table 1.)

Another consequence of the higher light output of the carbon arc is in the type of screen that can be employed with it. The almost universal practice with incandescent lamps is to use directional screens that throw the image back within a narrow angle. This has a limiting effect on audience size because the screen does not permit wide viewing angles. A flat screen, which will permit much wider angles of vision (up to the full 30 degrees cited above) and larger audiences, can be used with carbon arcs.

ECONOMY OF OPERATION

Another advantage offered by the carbon arc is its decided economy of operation. The Pearlex carbon-arc trim is designed for operation on a direct-current through a rectifier from a 110-volt, single phase, a.c. supply, with a current demand of less than 15 amperes—which is available from the ordinary convenience outlet. The carbons operate at 30 amperes d.c. with 28 volts across the arc.

[1] KALB, W. C. Carbon arc projection of 16-mm. film. Jour. Soc. M. P. Eng. 41: 95. 1943.

[2] ZAVESKY, R. J., and W. W. LOZIER. Increased light for projection of 16-mm. film with carbon arcs. Jour. Soc. M. P. Eng. 48: 448. 1947.

[3] Report of the committee on non-theatrical equipment. Jour. Soc. M. P. Eng. 37: 22. 1941.

TABLE 1—Possible screen widths and approximate theatre seating capacity, using a Pearlex and an experimental carbon trim to produce intensities of 5 and 10 foot-lamberts.

Carbon Trim	Lumens	Screen Width		Approximate Seating	
		10 ft.L.	5 ft.L.	10 ft.L.	5 ft.L.
Pearlex	1100	11.3′	16′	400	800
Experimental	2750	17.9′	25.2′	1000	2000

The burning life of this 1,100 lumens trim is one hour, ample for the projection of a 2,000-foot, 16-mm. reel at sound speed of 24 frames a second. The trim, currently selling for approximately 25 cents, pulls 1,400 watts from the power line. Ten-hour incandescent lamps that deliver 275 lumens to the screen sell at over 75 cents per hour of life and draw 1,000 watts from the power line. Thus the Pearlex trim can be operated for about one-third the cost of the incandescent lamp while delivering four times as much light.

COLOR QUALITY OF LIGHT

The operating characteristics of the carbon-arc trim for 16-mm. projection are similar in many respects to those of the Suprex carbons widely used for 35-mm. projection, but with certain modifications of color quality.[4] In the snow-white color of light typical of the high-intensity arc, the spectral energy distribution is characterized by an essentially even balance of energy throughout the different colors of the spectrum—which is desirable for the projection of 35-mm. film in color and in black and white.

The 16-mm. color film, which is now most widely used, has been processed for projection with incandescent lamps, however, and these lamps differ from the high-intensity arcs in that their light is relatively very low in energy in the blue and very high in energy in the red. As a result, when 16-mm. color film, processed for incandescent lamps, is projected by the snow-white light of the high-intensity arc, the blues are overemphasized and the reds are subdued.

The light from the Pearlex carbons has been adjusted to meet the requirements of such film by subduing the blue light and intensifying the red light. This has resulted in a color of light which is satisfactory for both 16-mm. black-and-white and color-film projection. Color-temperature of the screen light is approximately 4,450 degrees Kelvin.

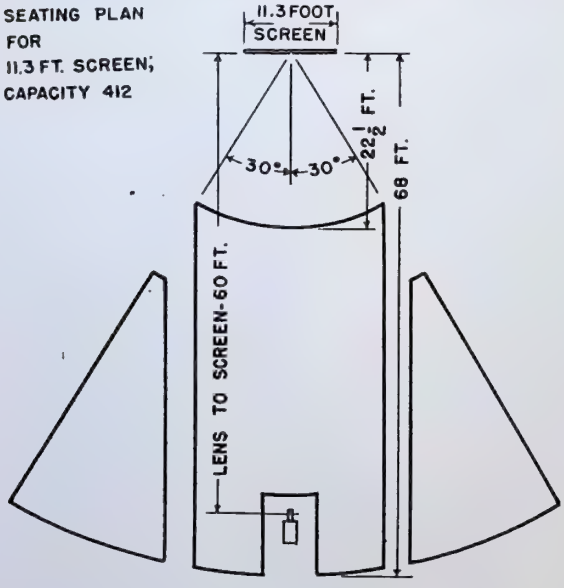
Data on screen light given throughout this paper are based upon untreated lenses. Carbon arc projection of 16-mm. film with untreated lenses meets recommended standards of projection practice. Use of treated lenses will, of course, still further increase the amount of light on the screen. This might be utilized either to make a given screen brighter or to adequately illuminate a still larger one.

Carbon-arc projectors are now available from all the larger manufacturers of 16-mm. equipment. They make practical the showing of 16-mm. pictures before a comfortably seated audience of several hundred at light levels conforming to the best standards of projection practice.

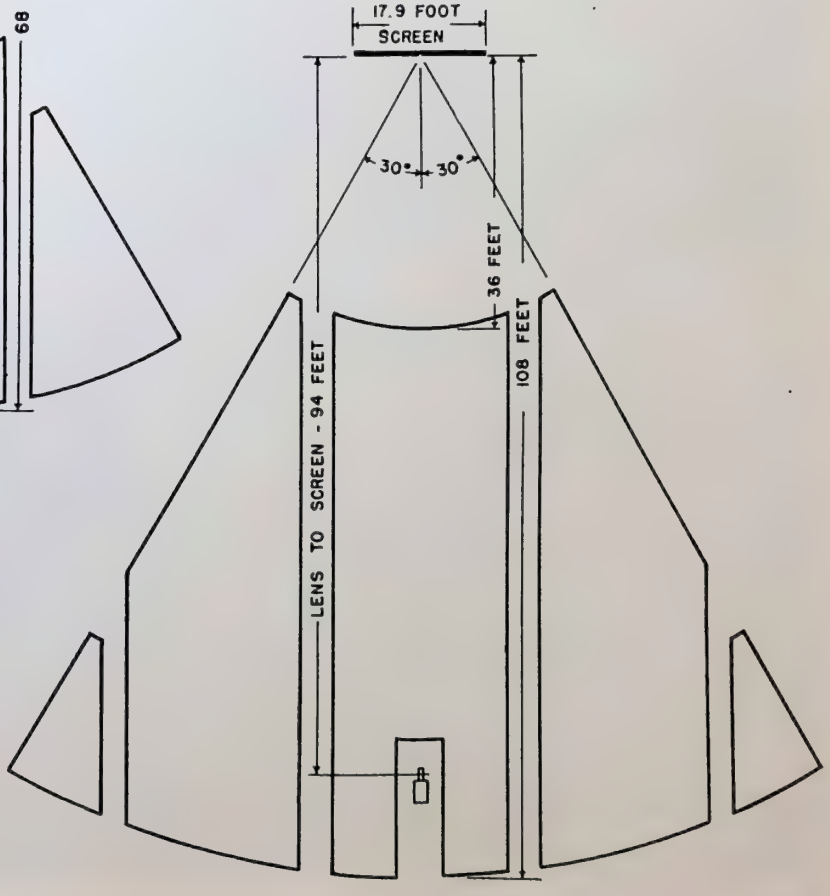
[4] LOZIER, W. W., and D. B. JOY. A carbon arc for the projection of 16-mm. film. Jour. Soc. M. P. Eng. 34: 756. 1940.

SUGGESTED SEATING PLANS are presented for theatres with capacities of 114 (bottom left), 412 (top left), and 1,016 patrons (right). These drawings (reduced in scale) are based on the recommendations that the patrons be seated not closer to the screen than twice the width of the screen nor farther away than six times the width of the screen, and all with a viewing angle of 30 degrees from the vertical plane. These plans are based on the use of 16-mm. high-intensity arc lamps for the 11.3- and 17.9-foot screens, and an incandescent lamp for the 5.7-foot screen.

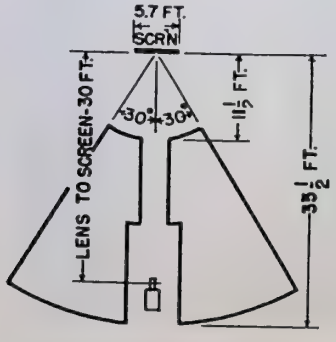
SEATING PLAN FOR 11.3 FT. SCREEN; CAPACITY 412



SEATING PLAN FOR 17.9 FT. SCREEN; CAPACITY 1016



SEATING PLAN FOR 5.7 FT. SCREEN; CAPACITY 114



Vogue Theatre, for Business and Pleasure

Installation of 16- and 35-mm. Projection Makes This Cinema Also a Business Theatre

IRVING M. LEVIN
San Francisco Theatres, Inc.

It is the unusual in showmanship that San Francisco's theatre-going public has come to expect at the Vogue Theatre, a 375-seat deluxe motion-picture house. Therefore, the Vogue was the natural choice of San Francisco Theatres, Inc., as the site for the novel experiment of screening both commercial and entertainment films in the same theatre.

Aware of the growing development and use of 16-mm. films in business circles, and of the possibility that these films might soon offer considerable competition to the standard medium, it was reasoned that both 16-mm. and 35-mm. pictures could be made available on the same screen. The Vogue Theatre already possessed a reputation for experimental enterprises in the entertainment field. A series of "festival" programs of musical, historical, and literary subjects in motion pictures has been acclaimed by San Francisco audiences. When a prominent wine company requested the use of the Vogue for a showing of documentary films to its sales executives during the daytime when the theatre was normally dark, it emphasized the possibilites in developing the facilities of the theatre for a two-fold purpose.

San Francisco theatres then moved to offer film display service not only to audio-visual minded business and industrial organizations but also to all fraternal, religious and foreign-speaking groups, who often show 16-mm. documentary films to their members. To provide for this service, the latest 16-mm. equipment was secured and installed in the Vogue's projection booth.

THE VOGUE THEATRE, San Francisco, is the site for the novel experiment of screening both commercial and entertainment pictures in the same theatre. The dual installations of both 16- and 35-mm. projection equipment give the theatre management the opportunity to rent the facilities to commercial organizations desirous of holding meetings where moving pictures can be shown, as well as to open wide a heretofore untapped reservoir of 16-mm. short subjects suitable for and worthy of inclusion in wholly entertainment programs. And San Franciscans like the idea!



FOR BUSINESS . . .

Dual equipment of the Amprosound 16-mm. high-intensity-arc-type projectors have been located beside the theatre's regular 35-mm. machines. The Ampro 16-mm. projectors—featuring an automatic fire shutter and triple-claw movement, and employing a 2-inch coated Simpson Optical projection lens —are equipped with Strong Junior-Hi arc lamps of the high-intensity type. This guarantees the Vogue Theatre a projection of approximately 1,000 lumens of light with its 16-mm. equipment that is indistinguishable from its regular operation. The 85-foot throw to the screen from the booth offers no difficulty to the smaller machine.

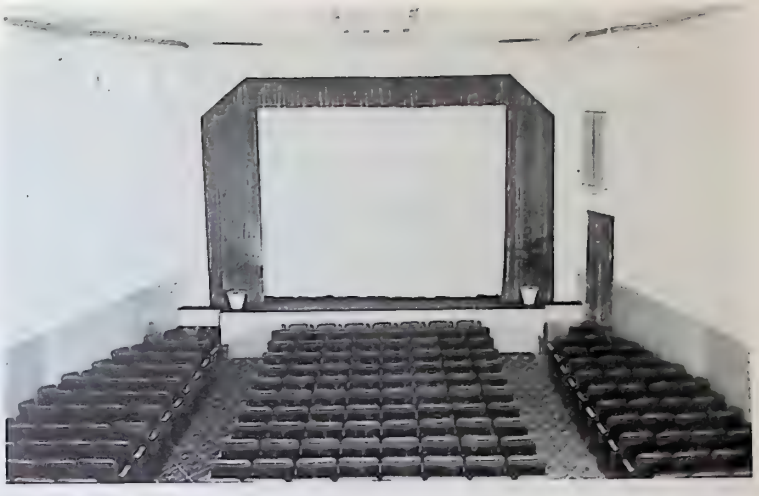
After special wiring had been installed for the new projection equipment and the 16-mm. machines permanently mounted, the sound was tapped into the Western Electric system already in use. George Austin, Vogue projectionist and 16-mm. specialist, prepared original techniques to provide smooth operating procedure for change-overs between the two types of machines. Through the use of a long lightweight metal bar attached to the 16-mm. change-over device, Austin is able to control both types from one position in his booth.

With these projection facilities, the Vogue Theatre is now enabled to sustain the high standards of screen performance that prevail in normal theatre option. Film showings to business and social groups in hastily established halls and hotel rooms were usually marred by distractions and low quality screening. This poor presentation, it was revealed, tended to legislate against relaxation and receptivity by the audience. At the Vogue, however, Bay Area advertising and public-relations executives are offered a theatre atmosphere, theatre seating, full lighting, and an enclosed soundproof projection booth with all details of the showing handled by his own staff.

. . . AND PLEASURE

In addition to the purely technical advantages of projection, the Vogue's appearance and location give it particular advantages. Only a ten-minute ride from any location in San Francisco, the theatre is situated in a lively shopping center accommodating both an exclusive residental area and a middle-class-home clientele. Four direct transit lines from the metropolitan area make the Vogue's neighborhood easily available by bus or street car. The theatre building itself presents a particularly eye-appealing construction unit. The house was recently renovated and redecorated. The facade, adhering to a simple functional design, displays an efficient example of neo-classic theatrical architecture. Dominant is a bold vertical sign displaying the theatre's name in flashing neon, with an auxiliary marquee predominantly amber in background color located directly beneath it. Simple neon strips decorate the ample marquee, while illumination from frosted glass panels in the soffit increase the light about the box office and outer lobby. Glistening white walls, trimmed with pale blue strips and royal blue tile, achieve a harmonious appearance at the theatre's entrance.

Heavy, white doors with circular windows of blue glass decorated with opaque

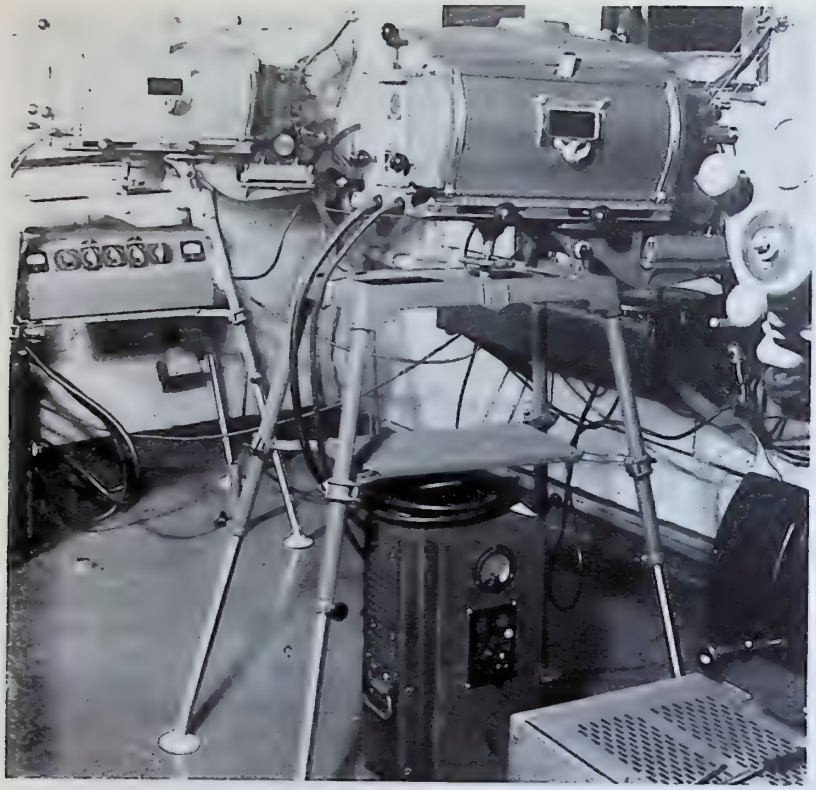


THE AUDITORIUM of the Vogue Theatre will seat 375, including a loge-like section, with leather-covered chairs, at the rear of the theatre. The main stage curtains are maroon, with the potted palms offering a suggestion of formality beside the proscenium arch. Lighting is from four chandeliers which maintain a royal blue motif. Indirect cove lights, blue and green, are located on the side walls.

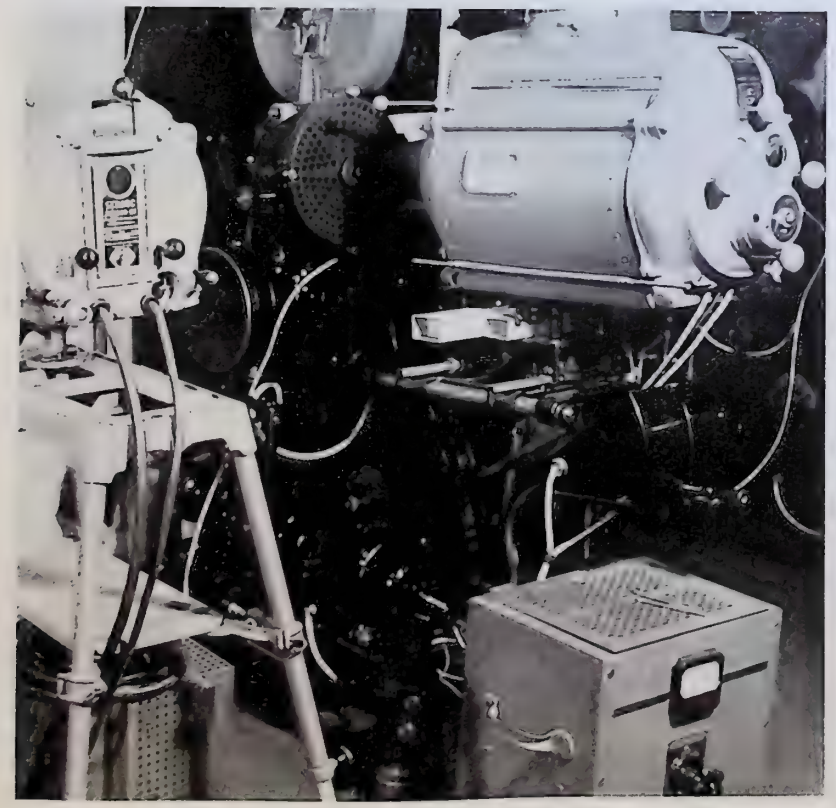


THE FOYER is a compact section, in pastel tones of soft yellow, powder pink, and gray. Blue carpets in a simple starred design, lobby settees, a small candy bar, an inset drinking fountain surrounded by golden mosaic, and a table for floral arrangements furnish the inner lobby from which two doorways lead directly to the auditorium aisleheads. The candy bar is back by the announcement board.





PROJECTION EQUIPMENT for 16-mm. films is a dual installation of Amprosound, backed by the Junior-Hi projection arc lamps and rectifiers of the Strong Electric Corporation. The 35-mm. projection lighting is from a Strong Utility arc for the 85-foot throw. Through an ingenious arrangement, change-overs are possible between any of the two pairs of projectors, effected from a single station.



unicorn designs lead directly to the foyer. It is a compact section in pastel color tones of soft yellow, powder pink and grey. Blue carpets in a simple starred design, lobby settees, a small candy bar, an inset drinking fountain surrounded by golden mosaic in glass, and a table for floral arrangements furnish the inner lobby. Two doorways lead into the auditorium opening directly upon the two aisleways.

All the 375 seats are located on the main floor, with a loge section of leather-covered chairs situated in the rear. Maroon curtains enliven the appearance of the stage, with potted palms offering a suggestion of formality beside the proscenium arch. Lighting fixtures consist of four large chandeliers which maintain the royal blue color motif. Indirect cove-lights, blue and green in color, are located on the side walls. A mobile public address system is maintained at the front of the auditorium to be made available to those who wish to make additional commentary to the film during business showings.

SUCCESS STORY

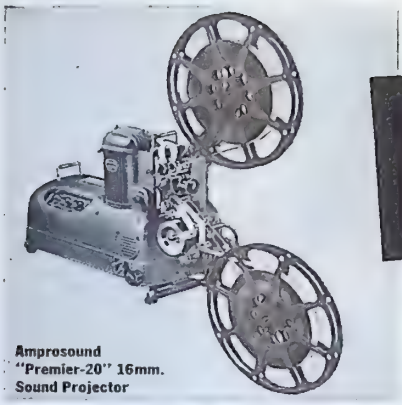
The new service at the Vogue Theatre had hardly been announced through news releases, brochures, and direct contact before interest was evidenced, not only in San Francisco but also in the business world of the nation. The unusual combination of a 16-mm. business theatre with a standard entertainment house appealed to editors of trade publications and business reviews, resultant in a series of articles concerning the new development. Requests for bookings quickly followed. The advertising agencies of the Pacific Coast were awakened to the new benefits for audio-visual selling within a theatre where prospective clients could concentrate upon the screen. Officials of several industries—a prominent oil company, a large lumber firm, a nation-wide telephone service—contracted for the use of the Vogue Business Theatre. Ambitious amateur cameramen booked it for their showings of travel, dramatic and educational films. A school board is utilizing its services for previewing motion pictures to test them before showing to the city schools. Contact men from a Los Angeles union requested the theatre for a nine-day period during their convention to promote southern California as a possible convention site for the next union conclave.

New series of amusement films for the Vogue's regular night performances also have been under way since the possession of 16-mm. projection equipment has made available many unusual prints restrictive to 35-mm. Literary, musical, and historical films, both documentary and entertainment types, are now being displayed to its patrons in special programs.

These new methods are already creating new markets at the Vogue. Instead of feeling apprehension, the company now welcomes expected developments in the field of 16-mm. films. The theatre is prepared to show whichever type of film is distributed, and in the meantime, it is creating its own particular uses for 16-mm. equipment which are suggesting a wider horizon to motion picture exhibition.

the AMPRO line

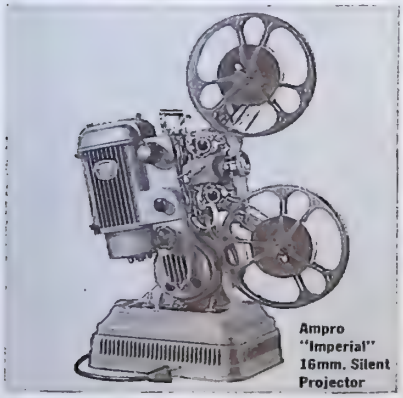
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